LECTURES TO NURSES

MARGARET S. RIDDELL

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LECTURES TO NURSES

USEFUL HANDBOOKS
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FIRST LINES IN NURSING. Being a Handbook for Junior Probationers and all who contemplate entering the Nursing Profession. By E. MARGARET FOX, late Matron of the Prince of Wales's Hospital, Tottenham. With a Preface by Sir JAMES GOODHART, Bart., LL.D., M.D., F.R.C.P. Size 7½ in. by 5 in. Bound in Cloth Boards, 2/6 net; by post 2/9.

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LECTURES TO NURSES

BEING A COMPLETE SERIES OF LECTURES
TO
PROBATIONARY NURSES
IN THEIR
FIRST, SECOND AND THIRD YEARS
OF TRAINING

BY

MARGARET S. RIDDELL

ASSISTANT MATRON, THE ROYAL HOSPITAL FOR SICK CHILDREN, EDINBURGH;
LATE ASSISTANT MATRON, CHELSEA INFIRMARY, LONDON; CERTIFICATED
BY ST. BARTHOLOMEW'S HOSPITAL, LONDON; AND LATE LECTURER
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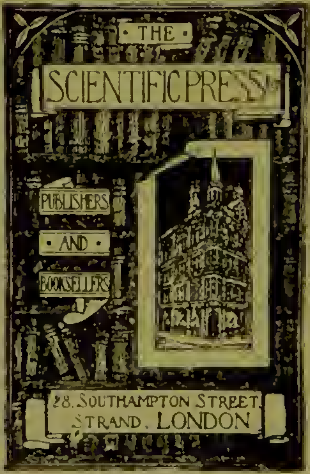

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PREFACE.

In this manual the endeavour has been to arrange three courses of lectures graduated to suit the growing knowledge of the probationary nurse during her three years' training. It is hoped that the book may serve as a guide to Sisters and others who have to lecture to probationers, and that it may prove useful also to Sisters in the Army and Naval Medical Services in preparing their lectures on practical nursing to ward orderlies and sick berth attendants. The lectures may also be of assistance to members of Women's Voluntary Aid Detachments who wish a more advanced course of instruction in Nursing than that required by the regulations of the British Red Cross Society.

It has been assumed that the reader has undergone a preliminary course of instruction in Anatomy and Physiology, and that the names and nature of the various diseases mentioned in the text are familiar to her from her attendance at lectures on Medicine and Surgery delivered by the Medical Staff of the hospital in which she is being trained.

The author has incorporated her extended experience as a nurse and teacher of nursing in the following chapters which have been made as concise and practical as possible. She desires to express her indebtedness to her brother, Mr. J. Scott Riddell, M.V.O., M.A., M.B., C.M., Senior Surgeon, Aberdeen Royal Infirmary, for revising the proof-sheets, and to the publishers for their kind attention.

MARGARET S. RIDDELL.

EDINBURGH.

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LECTURES TO FIRST YEAR PROBATIONERS.

LECTURE I.

INTRODUCTORY.

Hospital Etiquette—Qualifications of a Good Nurse—Ward Work—The Nurse's Duty to Herself.

HOSPITAL ETIQUETTE.

No woman should take up the profession of nursing unless she is prepared for hard work, continual self-denial, and constant subordination of her own will.

In hospitals and kindred institutions there is a code of manners which it is necessary for the nurse to learn. This etiquette may very fitly be compared to that of the army—the probationers being privates, the staff-nurses non-commissioned officers, and the sisters officers. It consists in showing respect to seniors and those in authority. It has nothing to do with social position and does not affect one's dignity. The etiquette of hospital life is simple and amounts to nothing more than ordinary politeness. A nurse should never remain seated when spoken to by anyone of higher rank or when visitors enter the ward. She should never push past a matron or a sister but should stand aside to let her pass. Should the matron enter a ward in the absence of the sister, the nurse, be she staff nurse or probationer, should come forward to see if she is wanted. This also holds good if any visitor enters the ward. It is usual for a nurse to open the door for the matron or the sister. She should never lean against a bed or table when a doctor or a sister is addressing her. The doctors and visiting staff are addressed as "Sir" and not by their names. In most hospitals the head of the nursing staff is addressed as "Matron," but the nurse soon finds out what is the custom of the institution in which she is training and follows it.

Be careful to treat visitors to the wards and friends of patients with the greatest courtesy. Quite a wrong impression is often given of an institution, because some nurse has been stupid enough to be brusque or snappish to an inquiring friend. The nurse should remember that she is the hostess in her ward for the time being and should treat visitors as guests.

When clergymen, priests or nuns come to visit patients, the nurse's duty is to secure quietness and privacy for them.

Every nurse must consider the reputation of her training school. If in later days she does something meritorious the question is asked "Where was she trained?" The same question is asked when a nurse is in disgrace, so that it behoves every member of tne nursing profession by her own example, by good conduct and conscientious work, to be an honour to the school that trained her.

Let the new probationer study the rules of the hospital when she first enters. There are generally two sets, one for conduct in the wards, and the other for the nurses' home. In some hospitals each new nurse is given a copy of these rules. There is then no excuse for breaking a rule, but too often a nurse only discovers that there are such rules by breaking one of them.

THE QUALIFICATIONS OF A GOOD NURSE.

There are certain qualifications which a woman anxious to become a nurse should possess. Some she may have before entering hospital, others have to be developed or acquired.

1. *Trustworthiness and Accuracy.*—Perhaps the most desirable attribute is trustworthiness—to be conscientious and faithful in the smallest detail of duty and to realize one's responsibilities. Accuracy is part of the reliability. Every order should be carried out with great exactness. Never guess at an order. If you do not understand or do not know, ask some one who does. The essence of accuracy is truth. Be accurate in giving verbal or written reports and also in the performance of every duty. Avoid all exaggeration. Tell things as they happened without any embellishments.

2. *Obedience.*—A nurse's duty is to give unquestioning obedience and loyalty to her matron and all others in authority. You may think that you would do things differently if you were responsible, but your duty is to obey, not to judge your superiors in rank.

3. *Tact.*—Another important attribute is tact. It is a gift but it can be acquired, and is a quality which every nurse should aim at.

In the first place a nurse must be tactful with her fellow-workers. You should be helpful and courteous to each other, and especially to the new-comer to whom everything in hospital is, at first, strange and unreal.

Next be tactful in your dealings with the doctors. They may be of great use to you in giving clinical instruction. At all times the relations between a nurse and a doctor in the wards must be purely professional. Do not gossip or discuss your superiors with the resident staff and never speak about the medical staff or discuss their treatment with patients. The nurse is there to carry out orders implicitly, not to criticize these orders.

Be tactful also with your patients; treat them with sympathy and kindness but be firm, for firmness is essential, but it should not be too severe in dealing with the sick; "the steel hand in the velvet glove" is what is required. It has been well said that what is requisite for good nursing is "knowledge without fuss and sympathy without sentiment". Never lose your temper with your patients. They are often very trying, but you are there to serve and you should give that service ungrudgingly. The nurse should cultivate a cheerful kindly manner in dealing with sick people.

4. *Observation.*—This comes only by training and is perhaps the most important qualification. No one can be a good nurse who does not possess this power and know how to use it. The powers of observation have to be exercised —the nurse must use her eyes and take note of everything that is going on in the ward. The smartness of a ward is made up of little details. The nurse, then, should learn to see the little things, whether a corner has been left undusted, or a bed is not quite straight or an empty feeding bottle has been left lying by a cot. These items may not seem of much importance, but if you fail to see them it is unlikely that you will observe the signs and symptoms of disease in your patients at a later date in your training, for seeing and observing are two very different things. Probationers often think that a sister has "eyes in the back of her head," simply because by years of training she has

cultivated this most necessary habit of observation, and notices at once what is not done or is done badly in her ward.

WARD WORK.

A certain amount of drudgery must be done during the probationary days. The new probationer finds that her day's work consists mainly of sweeping, dusting, polishing brasses, scrubbing lockers and other more or less menial tasks. Her only nursing duties will probably be to help in making beds, to give bedpans, and to carry in meals, but when she has learnt to do these things satisfactorily, she will be given more important duties.

Most wards have a time-table of work in which the duties of each nurse are clearly defined. The nurse should have forethought and reckon how long each piece of work will take and so plan out her day. She should not be fussy in her work but should move quietly and without hurry or bustle.

Above all things the nurse must learn to be punctual in the ward and out of it. The work of the day should be begun at once. Many precious minutes may be wasted in chatting with the other nurses. She must be methodical and tidy, always cleaning up as she goes. If her memory is bad, she should make notes of important duties so that she can refer to them when necessary.

A nurse must be economical in her use of the valuable materials belonging to the hospital. Few nurses realize that the constant waste of items like methylated spirit or lint helps to make up hospital extravagance. It is the experience of most institutions that the petty expenses make the expenditure large and every nurse should be as careful of the stores of the hospital as she would be of her own.

Let it be the laudable ambition of every nurse to have the ward she is working in the smartest, cleanest, and happiest in the hospital. To this end she must be methodical, conscientious, kindly and, above all, enthusiastic in her work.

The Nurse's Duty to Herself.

She should report any illness of her own, however trivial. Great care should be taken of any scratch or cut on the hands. Neglect of this may end in a poisoned hand, and days or even weeks off duty. The feet also require attention. The nurse has much running about and standing to do, so she should take any opportunity of resting her feet. She should not be persuaded into buying what shoemakers call "ward shoes". They are often made with too little support to the instep and are apt to produce flat foot. Ordinary walking shoes which have been worn for some time for out-door use give much more support and are more comfortable in every way, so long as the heels are not too high. For quietness in the ward they should have rubber heels or tips put on. Suspenders should always be worn instead of garters, as the latter impede the circulation of blood in the legs and may cause varicose veins.

A daily bath should be taken if at all possible. If there are any dirty heads in the ward it is desirable that the nurse should comb her own hair carefully, as pediculi are easily contracted.

The nurse should keep her bedroom window open top and bottom, day and night. A well-ventilated room is as necessary for her as it is for her patients.

When off duty she should go out if only for a bus-ride, as change of scene and fresh air will refresh her, however tired she may be. If the fatigue is not too great, it is advisable to take up some hobby or sport, such as swimming or tennis, as the interest taken in these pursuits turns her attention from the worries of nursing duties.

LECTURE II.

Hygiene—Bed-making—Special Beds—Warming Beds—Bed Rests and Cradles.

HYGIENE.

By hygiene is meant a system of principles designed for the promotion of health. These laws of health may be summed up briefly, as cleanliness, pure air, suitable food, sufficient exercise and rest, and proper clothing.

In hospital wards all these are most necessary, as we are working with the sick. The most important subject is *Ventilation.* The nurse has been taught in physiology that respiration consists of two phases—inspiration or breathing-in and expiration or breathing-out. Every 100 parts of pure air consists of twenty-one parts of oxygen, seventy-nine parts of nitrogen, a trace of carbonic acid gas and a minute portion of watery vapour. Respired air differs from this in having lost 5 per cent of its oxygen and gained 5 per cent of carbonic acid gas; it is also saturated with watery vapour, contains other impurities and is considerably warmer. This "bad air" which we are continually breathing out, must be systematically removed from our sick-rooms or wards and pure air supplied in its place. This is done by means of *Ventilation.*

Experience has shown that each person requires 3000 cubic feet of air in the hour. In hospitals we try to allow from 1000 to 1200 cubic feet for each patient and to change it three times in the hour by ventilation. In nursing infectious cases and in some surgical ones, 2000 cubic feet are allowed. To find the cubic air capacity of any room or ward the length is multiplied by the breadth and then by the height. The total is divided by 1000, which is the cubic feet of air required for each patient, in order to ascertain how many beds can be placed in the ward. Given a ward 80 feet long, 25 feet wide, and 10 feet high, by multiplying these dimensions together we get an air capacity of 15,000 cubic feet. We divide by 1000 and find that fifteen beds can be placed in a ward of that size.

The nurse will find that ventilation is often a difficult problem. Few patients will thank a nurse for an open window, but it stands to reason that if a number of persons are breathing in pure air and breathing out impure, the air is soon vitiated and the ward becomes what we call "stuffy". In sickness, there are many other things which add to this impurity—emanations from the skins of patients, evacuations from the bowel, dirty dressings and soiled linen; all of these help to poison the air.

Two things are necessary in the management of ventilation, the first is to understand its importance and the second is to carry it out successfully. Every nurse comprehends its importance. To be successful in ventilation we must accomplish two ends—to remove the used-up air, and to supply fresh air without chilling the patient.

In wards there must be inlets for fresh air and outlets for foul. The three chief means of ventilation are: (1) *the fireplace*, (2) *the windows*, (3) *ventilating shafts.*

1. *The Fireplace.*—Air when heated expands, rises and escapes by the nearest outlet while fresh air is drawn in to take its place. If there is a fire, the air round about gets

heated and expands, passes up the chimney, and into the vacuum so-formed air is drawn to take its place either by the windows if they are open or by the door.

2. *The Windows.*—These act both as inlets and outlets. The windows in a ward should be kept open at the top for a few inches day and night, so that foul air may escape and fresh air enter. There may be a certain amount of draught by this method as the cold air rushes in and falls downward, but fresh air is so essential to the well-being of patients that we must do our best to prevent any harm to them from this draught by giving them an extra blanket, or a hot-water bottle if they complain of the cold, or by putting a screen round the bed if there is a direct draught.

Ventilation must be attended to, as neglect of this duty favours the development of disease, retards the healing of wounds and generally lowers the vitality of the body. The nurse must always be careful to close the windows near a patient who is being washed, is being examined by the doctor or is having a dressing done, opening them again when such operation is over.

The Hincke's Bird method of ventilation is a very useful and simple one for a small ward or sick-room. The lower sash of the window is raised from 3 to 10 inches and the opening closed by a wooden board that fits exactly. The incoming air passes between the two sashes at the middle of the window, is directed upwards, is warmed, and distributed throughout the room without draught.

3. *Ventilating Shafts.*—These are of many kinds. One of the most common is Tobin's Tubes. They are flat L shaped tubes against the wall, opening into the outer air below and into the room fully six feet above the floor. The principle in most methods of ventilation is to give the

air an upward direction, so that it is broken and warmed before reaching the occupants of the room.

Light and Sunshine are also very essential in nursing the sick. The ideal sick-room has a southerly or south-westerly aspect so as to secure more sunshine. The sun is a natural disinfectant and destroys germs, so do not pull down blinds unless there is too much glare for the patient. There are some cases, such as patients with brain disease or eye trouble, where the light must be shaded, but in most cases light and sunshine are very valuable helps in nursing sick people.

Besides attending to the purity of the air, the nurse must be careful to ensure cleanliness in the lavatory utensils, and must see that all sinks and closets are kept clean and flushed. All evacuations from the patient, and soiled linen or dressings must be at once removed from the ward. It is a good plan for the nurse to go out of the ward sometimes and come back to it in order to test if the air is at all close. Patients should never be allowed to interfere with ventilation by opening or shutting windows.

The door is, as a rule, a poor means of ventilation, as it only lets in air from other rooms and passages, and that generally with a draught. The nurse should remember that doors were made to shut and windows to open, not the other way about.

The Temperature of a Ward or Sick-room should be kept as nearly as possible at 60° F. For some cases, such as old people with bronchitis or for very young children, it may be a little warmer, up to 65° F. The nurse must endeavour to keep the room at the required temperature, and a ward thermometer should be hung on the wall on a level with the patient's face in order to show the temperature of the air which the patient is breathing. It is usual to keep a record of the temperature of a ward, especially during the night. The coldest time is about two o'clock in the morning, the hottest at three in the afternoon. It is the nurse's duty at these times to see that the temperature of the ward does not fall too low or rise too high.

BED-MAKING.

In lecturing to probationers or others who are training to nurse the sick, it is hardly necessary to describe bed-making in detail. Much the simplest way is for the lecturer to place a bed in the lecture-room and to give a practical demonstration. A nurse has to make so many beds every day that much practice should make perfection.

The hospital bed is generally of the Lawson-Tait pattern —an iron bedstead with a wire mattress. It is about 6 feet 6 inches long and 3 feet wide and of varying height, and this allows a nurse to attend to a patient and to move him conveniently. Over the wire mattress a bed sacking or canvas is placed to protect the mattress proper, or the hair mattress itself is covered with a loose washing cover. It is usual in hospital, especially in all emergency beds, to put a long mackintosh over the mattress to prevent the chance of its getting stained with discharges. The undersheet should be tightly tucked in so as to be quite flat, and for economy in washing the bolster is tucked into the top of it.

The *draw-sheet* which is placed across the bed from the level of the patient's shoulders to below the knees is used in most cases where the patient is entirely confined to bed. Its advantage is that, if it gets at all soiled, it can be more easily changed than an undersheet, and, if it gets hot under the patient, a fresh piece can be pulled through. It must always be pulled very tight so as to be quite free from creases. The upper bedclothes should be light but warm, and should not be tucked in so tightly that the patient cannot move comfortably. The pillows are arranged to suit the individual case. As far as possible all the beds in the ward should be neat and uniform in appearance, but the nurse must not be too tyrannical about uniformity. A well-made bed has to please the patient as well as the sister of the ward.

In making a bed, the bedclothes should be folded and placed on a chair or stool at the end of the bed. If the patient is able to sit out to have his bed made, see that he is covered with a blanket and put a hot-water bottle at his feet for a footstool.

The changing of the undersheet and draw-sheet is best shown by demonstration. It may be done from side to side, or in leg cases, especially where there are splints, from the foot to the head. With helpless patients I have always found that to move them on to an empty bed while their own is being turned and made up with clean sheets is much less fatiguing than the rolling from side to side, and is in every way more satisfactory. The empty bed can be placed alongside the other and the lifting of the patient done without any strain.

SPECIAL BEDS.

(*a*) *The Fracture Bed.*—This is made in the ordinary way, but a wooden board is placed below the hair mattress to prevent the spring mattress of the bed from yielding, and also to steady the patient.

(*b*) *The Bed for a Case of Acute Rheumatism or Nephritis* differs from the ordinary bed in being made up with an underblanket and a top blanket between which the patient lies instead of between sheets. Sweating in these cases is so profuse that blankets are needed to absorb the moisture and so prevent chill. A draw-sheet is used across the under blanket in the usual way, and the top sheet placed over the upper blanket so as to make the bed neat.

(*c*) A special arrangement of the bedclothes is sometimes used *to facilitate the passing of a catheter, for a vaginal examination, and after an amputation* so that the stump can be watched. A blanket is doubled, folded in a sheet and placed over the patient to cover the upper part of the body as far as the groins; the top sheet and blankets are folded down so as to cover the feet and legs up to the groins, the upper clothes overlapping them by a few inches. The counterpane can be placed over all, leaving the bed quite tidy until such time as the examination is to be made, when it is folded down to the end.

(*d*) *A Tent Bed* or steam tent is useful in cases of diseases of the respiratory tract, especially in children. Special poles are fixed to the corners of the cot, and a tent cover placed on these to form a canopy and tent which envelops the cot, an opening being left at one side to admit air, and to allow the child to be watched. If poles are not available a draught screen, or a clothes-horse over which sheets or blankets are arranged, will serve the same purpose.

(*e*) *An Operation Bed.*—The bed is made in the usual way as far as the draw-sheet, but without bolster or pillow. Three or four hot-water bottles are placed along it and a blanket folded double put over these. The upper sheet, blankets and counterpane are put on and tucked in at the bottom, but left free at the sides; they are then rolled down all together to the end of the bed. When the patient is brought from the operating theatre all that requires to be done is to remove the blanket and bottles, leaving the bed free for the case to be placed in any position. The blanket which is warm from contact with the bottles is then wrapped round the patient, the bottles arranged with the precautions noted below, and the upper bedclothes unrolled and placed in position. Two pillows should be at hand, one for the head when the patient recovers consciousness and the other in case it may be wanted to put below the knees to relax the abdominal muscles in abdominal operations or to lay a limb on.

The upper bedclothes may be tucked in at one side and left free at the end, being rolled all together to the tucked-in side, but on the whole the method described above is more satisfactory, as the bed is then left quite free.

WATER-BEDS AND AIR-BEDS.

These are used as a preventive of bedsores in spinal cases, and in cases of paralysis, and are also very useful in long, wasting illnesses.

The *Air-bed* consists of several tubes or compartments, each tube having its own valve and being inflated separately by means of a bellows. When in use the air-bed should be covered by a blanket; a long mackintosh is then put on and the bed made as usual. Rubber is easily ruined by coming in contact with ointment or grease of any kind and the mackintosh is put on as a protective.

A *Water-bed* when filled is very heavy; so the bed must be strengthened by placing a fracture board over the framework. On this a hair mattress is placed, then the water-bed, which is covered by a blanket and the bed made in the ordinary way.

To fill a water-bed after it has been placed in position, unscrew the stopper and by means of the rubber funnel attached to the bed—or more quickly by means of a large ordinary funnel inserted in the opening—pour in warm water at 90° F. till the bed is rather more than half-filled. Sometimes a few pints of carbolic lotion (1 in 20), are put in first. Raise the funnel end a little and roll up the bed from the other end to expel any air, then screw the stopper in. The water-bed should be emptied, washed, and refilled at intervals if it is being used for a long case. Great care must be taken that no grease gets on the rubber and that the bed is not damaged by sticking safety pins into it.

Warming the Bed.

Hot-water bottles or substitutes for these are indispensable for warming beds, and for applying dry heat when warmth alone is required. The indiarubber bottle is very adaptable, but it is too expensive for ordinary hospital use, besides having the disadvantage of not keeping the heat so long as less expensive kinds. Tin, and other metal bottles are good, but they are apt to leak and they occasionally rust and damage bed-linen. The most practical bottle is the earthenware one; but the nurse must see that the stopper is well screwed in and that the washer is in good condition. Whichever kind of bottle is used, it must be well covered with a bag made of house-flannel or old blanket and securely tied at the top. The bottle should be placed in bed, with a blanket between it and the patient, and this precaution must be carefully adhered to in nursing unconscious or paralysed patients and young children, as from want of care burning accidents are not uncommon.

As substitutes for bottles, bags filled with hot bran or salt, or bricks which have been made hot in an oven and well covered with flannel may be used.

BED-RESTS AND CRADLES.

When it is necessary to prop a patient up in bed, as in a case of fractured ribs, after abdominal operations, or in any disease in which the breathing is very laboured, a bed-rest is used. The pattern used in hospitals consists of a wooden frame with a spring-chain or couch back, which can be fixed at any angle by means of a hinge. Pillows are arranged on the slope to suit the patient. A bed-rest can be improvised by inverting a light cane-backed chair and fixing it to the head of the bed, so that the back is sloping down behind the patient.

The nurse will find that the patient tends to slip down when in this position. To obviate this difficulty, a small stool may be placed at the end of the bed so that the feet press against it. In many ways the most efficacious method is to place a roller pillow across the bed just below the buttocks, fixing it by means of lengths of webbing sewn on at each end and secured to the top of the bed at each side by buckles. Raising the end of bed on blocks also helps to prevent the slipping down. "*Fowler's position*" is a convenient name given to this raised position of the patient, and is of service for assisting the gravitation of fluid towards the pelvis after abdominal operations. Fowler's original suggestion was that the upper end of the bed should be raised on blocks, but the practice is now to set the patient upright in bed in such cases, and to support him by the buttock pillow and webbing.

Bed-cradles are used to prevent the pressure of bed-clothes on any part of the body in cases of fracture or after abdominal operations. Sometimes in fracture of the leg, the limb, after being put in splints, is suspended by straps to a cradle and allowed to swing. The ordinary cradle consists of stout wire hoops which are fixed into wooden or metal supports and is of various sizes. An improvised cradle can be made very easily from a bandbox with the ends cut out, or from a child's hoop cut in two parts, which are crossed and fixed with string.

LECTURE III.

CARE OF THE SICK.

Bathing in Bed or in Bathroom—Care of the Hair—Care of the Mouth—Bedpans—Admission of New Patients—Prevention of Bedsores.

BATHING IN BED.

EVERYTHING that is necessary for the bed-bath should be got ready before beginning, so that the nurse need not leave her patient during the process. The windows near the bed must be closed and a screen put round the bed. On a table or locker by the bed, place a basin of hot water at 105° F., soap and flannel, towel, spirit and dusting powder and a clean shirt or nightgown. The bedclothes are then removed, leaving one blanket covering the patient; a bath blanket is rolled under him and his shirt removed. The bath blanket can be tucked over him and the covering blanket removed. The finger and toe nails should be cut first. In bathing begin with the face and neck, then the arms and chest, then the abdomen, first one leg and then the other, then turn the patient on his side and wash the back. Each part should be dried and covered before proceeding to the next, only the part being washed to be exposed. In very dirty cases the nurse may find it necessary to change the water once or twice during the bath. If the knees, heels, elbows or feet are engrained with dirt, a little turpentine may have to be used, but be careful to wash it off afterwards, so that it does not irritate the skin. Sometimes it is even necessary to foment the parts for a few hours in order to loosen dirt. The nurse must pay special attention to cleaning the ears, nostrils, armpits, and umbilicus, which owing to neglect on the part of the patient are often very dirty.

Bathing in Bath-room.

The patient may be well enough to have a bath in a bath-room. The nurse should close the window, fill the bath with water at a temperature of 100° F. (tested by a thermometer). Everything that will be required should be put there, including a dressing-gown and pair of slippers for the patient to put on to get back to the ward. A patient should never be left alone in a bath-room as accidents frequently occur owing to a patient fainting or having a fit in a bath. Some institutions have bath keys for turning on the hot and cold water taps. These are in the possession of the nurse, so that the patient cannot interfere with the taps. It is usual in hospitals for a porter to attend to the bathing of the male patients, the nurses attending to the women.

Care of the Hair.

The head is washed last, being well lathered with a soapy solution, then rinsed and in female cases rolled into a bath-towel and well rubbed till dry. The hair of women patients should be combed, then divided in the middle and arranged in two plaits one on either side, each plait being tied with ribbon or a piece of bandage. If the head is dirty, that is if it contains head lice (pediculi capitis) or nits, it is advisable to use soft soap for washing the head and after drying to comb the head with a fine-toothed comb which is dipped into a solution of equal parts of carbolic lotion (1 in 20), and methylated spirit each time it is taken through the hair, and wiped on a piece of old wool. Where the head is very dirty and it is necessary to kill pediculi, a carbolic cap is used. This consists of a layer of lint large enough to cover the scalp, soaked in carbolic solution (1 in 40). It is placed on the head, covered with a piece of protective and fixed either with a capelline or a triangular bandage. This is put on at night and in the morning the head is combed with a fine comb to remove the dead pediculi. Oil of sassafras is sometimes used instead of carbolic solution for children. It is very efficacious but has a very pungent and disagreeable odour. The head is washed well with soft soap and water in the morning after the sassafras cap comes off, and the dead lice are removed by combing with a small-toothed comb.

Should the head be hopelessly dirty or covered with scabs and sores it may be necessary to have it shaved. The nurse is reminded that the permission of the patient herself or the parents' permission in the case of a child must be got before resorting to this drastic measure.

Care of the Mouth.

In sickness as in health it is very important that the mouth should be kept clean. If the patient is able to do so it is more satisfactory for him to have a toothbrush and tooth powder and to use them. In helpless cases a mouth wash such as listerine or hydrogen peroxide (1 ounce to a pint of water) helps to cleanse the mouth when it is dry and is used the first thing in the morning. The best method in acute cases when dry brown crusts (sordes) collect on the teeth and gums, is to use several pieces of wool or gauze. A piece is wrapped round the nurse's index finger and dipped in hot water or ebtter a mixture of glycerine and lemon juice, and the teeth, mouth, and gums are then well swabbed. To do this thoroughly the gauze or wool must be changed frequently and should be burnt afterwards. If the patient is delirious the nurse must use pieces of stick to wrap the wool or gauze round, or a pair of dissecting or Spencer Well's forceps, rolling the gauze round the points of the forceps, so that she does not get bitten.

In all cases of high fever the mouth requires attention after every feed or four hourly.

To Give a Bedpan.

The two bedpans in common use are the circular and the slipper—the circular being the more useful of the two. A bedpan should always be warmed before it is taken to a patient. This is generally done by placing it in a lavatory sink and letting hot water run on it. It must of course be wiped dry afterwards. When being carried to the patient it should be covered with a cloth kept for that purpose. After use it is again covered and removed at once from the ward to be emptied or kept for examination as required. When the patient is very emaciated and bedsores are imminent, it has been advised to smear the rim of the bedpan with oil. At least once a day all bedpans and urinals should be thoroughly cleansed and scalded.

Many patients are able to help themselves a little, when one nurse can easily give a bedpan, but in helpless cases it is better for two nurses to do this, one lifting the patient and the other adjusting the bedpan and the same in removing it.

ADMISSION OF NEW PATIENTS.

On admitting a new patient the first question will be whether he can have a bath in the bath-room or will require to be bathed in bed. If the doctor has given no definite order, this point will be decided by the sister or the staff nurse acting for her, who will judge by the general condition of the patient. Accident cases, especially those with wounds or fractures, generally suffer more or less from shock and should be bathed in bed. If the patient has a high temperature, or is suffering from difficulty in breathing, or if he has any rash or skin disease, a blanket bath is indicated. The bed in such cases should be covered with a mackintosh and bath blanket and hot bottles should be placed in it.

Immediately on admission the temperature, pulse and respiration of the patient are taken and recorded. The clothing when removed is neatly folded into a bundle, labelled with the name of the patient, a list being made in a book generally kept by the sister for that purpose. The clothing is then stored. In some institutions the clothes are returned to the friends who wait and take them away with them. If it is to be stored, any valuables should be removed from the pockets, made into a parcel and given to the sister of the ward for safety or sent to the Steward to be locked up till the patient is leaving the institution.

The clothing should be carefully examined to be sure that it contains no parasites. If there are any or if the clothes are soiled they should be sent to be disinfected in the one case or to the laundry to be washed in the other.

Every patient on admission is bathed in a bath-room or as described under "Bathing in Bed". Occasionally it happens that the patient is admitted in a collapsed state and is too ill to bear the fatigue of such a proceeding. In such a case the bath should be postponed for a time till the period of exhaustion is over; the patient being in the meantime wrapped up in warm blankets and surrounded by hot-water bottles.

The bed should be chosen to suit the case if possible. An end bed screened off for quietness is generally chosen for cases of chorea; and for a big abdominal operation case a bed in the centre of the ward to avoid draughts.

A specimen of urine is procured as soon as possible and put up for examination.

If the case is an *accident one* keep the patient flat so as to lessen the risk of faintness and watch for any signs of collapse while you are washing him. In fracture cases, be careful in removing the clothing that the injured part is supported. If the arm is broken get the arm on the uninjured side out of the sleeve first, then free the injured arm, if necessary by slitting up the seam of the sleeve. In a fractured leg, rip up the outer seam of the trouser on the injured side; having loosened all buttons and braces, free the limb, and it will then be quite easy to get the trousers off the sound leg. In all cases of fracture of the extremities, wash the fractured limb first and very carefully; then put it on a pillow and support it with sand-bags at each side so that it is kept in position while the bath is in progress.

BEDSORES.

Their Prevention and Treatment.

Great care must be taken to prevent the formation of bedsores, as they are, except in a few cases, due to want of care on the part of the nurse.

Bedsores are due :—

1. *To Pressure* from patients lying long in one position, as in wasting illnesses like typhoid, in diseases affecting the circulation and in dropsy when the tissues are distended with fluid. They are common in cases of paralysis because the nerves are not in working order and the skin is badly nourished; the patient moreover is unable to move and there is generally incontinence.

Allied to this bedsore caused by pressure is the "splint sore" produced by the pressure of a splint.

2. *To Friction* from the undersheet and draw-sheet not being kept smooth and free from creases, or from crumbs in the bed. The friction may be due to irritation from the part being left improperly dried or as the result of bad soaps used on tender skins or from soaking in cases of incontinence of urine.

3. *To Diseases of the Spinal Cord* as in myelitis (inflammation of spinal cord) when the patient is more or less completely paralysed below the seat of disease. In such cases it is very difficult to prevent bedsores forming and a water bed should be used from the first.

Bedsores are also caused by careless handling of the patient or by injury from a bedpan if the nurse is not watchful to avoid this.

They form as readily on very fat people as on the thin; in the former owing to the weight and difficulty in moving or lifting —in the latter because there is no fat to cushion the bones.

Bedsores may occur on all parts that are exposed to pressure, as the bottom of the back over the sacrum; the hips, the shoulderblades, the heels and elbows. From friction they are found between the knees, on the back of the head and inside the ankles.

How to Prevent Bedsores.

Keep the draw-sheet cool and free from creases or crumbs. All parts pressed on should be washed with soap and water twice a day, well dried and rubbed with methylated spirits or brandy, and dusted with a simple powder such as powdered starch or a mixture of zinc and starch. Good yellow soap is quite safe to use and the spirit should be well massaged into the part so as to promote the circulation, as well as to harden the skin.

Careful watch must be kept for any signs of pressure, and in serious illnesses the position of the patient should be changed every two hours. If there is any redness, an air-cushion or water-pillow should be used, and in such a condition spirit may cause smarting, so it is better to rub in a little zinc ointment, but powder should not be used with the ointment.

In *Cases of Incontinence* special attention must be given. Each time the patient requires a change of sheet, the back must be well washed and dried. Instead of using spirit and powder, rub some ointment in with a circular movement, but do not dust with powder as it is apt to cake into a hard mass on the ointment and to press on the part. Lanoline, zinc ointment or a mixture of zinc ointment and castor oil (6 drachms of zinc to 2 drachms of oil), are safe emollients to use.

How to Treat Bedsores.

If the skin is once broken, the doctor must be told and the treatment left to him. The wound is generally cleaned with a simple antiseptic like boracic acid and ointment smeared over the sore.

If a slough has formed, hot boracic fomentations shaped so as to fit the wound exactly may be ordered, or the wound may be syringed with lotion such as hydrogen peroxide, but the doctor will order the lotion he prefers. In very bad sloughing sores, charcoal poultices are sometimes employed. After the slough has separated an antiseptic dressing of gauze cut to fit the wound or an ointment dressing cut in the same way is ordered. It is applied, covered with wool and fixed in position by strapping. The strapping should be cut long enough for the ends to be attached to the skin at some distance from the sore, as the skin will probably be tender near the actual sore. Red lotion and collodion are also used for dressing bedsores, but the nurse must be guided by the doctor as to the treatment when the sore has formed. Her endeavour should be to do all in her power to prevent the formation of a sore.

LECTURE IV.

TAKING OF THE TEMPERATURE, PULSE, AND RESPIRATION.

Taking of Temperature, Pulse and Respiration—Charts and Charting—Observation of the Patient—Giving and Writing Reports.

Taking of the Temperature.

The temperature or heat of the human body is registered by a Clinical Thermometer.

The Clinical Thermometer.—This thermometer consists of a closed glass tube with a bulb at one end containing mercury, and a fine stem in which the mercury rises when heated. It differs from a ward or bath thermometer in being self-registering. The mercury does not fall when cooled, but remains stationary until it is forcibly shaken down. The thermometer is scaled from 95° F. to 110° F. and there are black lines to indicate the intermediate degrees and four small thin lines between each degree to mark the decimal points—thus we have a black line to show 97° F. then four small ones which represent 97·2°, 97·4°, 97·6°, 97·8°, and again a strong line for 98° F.

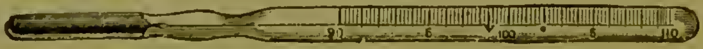


Fig. 1.—Clinical Thermometer.

The normal temperature of the human body (98·4° F.), is marked on the thermometer by an arrow. Thermometers vary in the length of time they take to register. Some act in half a minute, others take three minutes. It is always safer to keep them in position for a longer time than they are registered for.

Care of the Thermometer.—Thermometers are a very heavy item in hospital expenditure and nurses should be careful in their use of them. They must be kept clean in some disinfectant solution. A small glass vase with a piece of cotton wool at the bottom, on which to rest the bulb, and filled with carbolic lotion (1 in 40), makes a suitable holder for them. The lotion they are in should not be too strong, as in time it obliterates the markings.

After use the mercury should always be shaken down, the thermometer washed with cold water or a disinfectant if necessary and replaced in the vase.

To Take the Temperature.

In an ordinary case the temperature of the patient is taken twice a day, morning and evening. It should always be taken before the patient is washed, or an hour should elapse after washing before it is taken. In acute illnesses the temperature may be taken four hourly, two hourly, or hourly, if so ordered. It should be taken as nearly as possible at the same time every day. The temperature may be taken in the axilla, groin, mouth or rectum.

1. *In the Axilla.*—Dry the armpit first and, after making sure that the mercury in the thermometer is below 95° F., place the bulb in the middle of the axilla and keep it in position by holding the patient's arm across the chest. The thermometer should remain in the axilla for at least four minutes, is then taken out, the temperature read, and at once recorded, either in a book set apart for the purpose or on the chart.

2. *In the Groin.*—This method is sometimes used in children or in cases where the armpit cannot be used. The bulb of the thermometer is placed in the fold of the groin and held in position by flexing the thigh. It is advisable to hold the thermometer in when nursing children, as so many thermometers get broken from want of this precaution.

3. *In the Mouth.*—This is a reliable method if the patient can be trusted to hold the thermometer. In taking it in this way the patient should not have had anything hot or cold to drink for some time before. It is taken in the mouth if the patient is having a vapour or a hot-air bath. It must never be taken in the mouth of a child or in the mouth of a patient with delirium, in chorea or any form of distressed breathing.

Having washed the thermometer carefully place it under the patient's tongue on one side of the mouth and ask him to close his lips upon it. The patient must not speak while it is in his mouth. The temperature in the mouth registers a little higher than in the axilla or groin.

4. *In the Rectum.*—It is well to remember that a temperature taken in the rectum registers one degree higher than in the other parts ; so if it is once taken there, the nurse should continue to do so and should inform any nurse who may do her duty that it is being taken in this way. It is the most accurate method, and is used in nursing young children, and also in cases of hyperpyrexia when cold baths are being given to reduce temperature.

The bulb is oiled or lubricated with vaseline and inserted for about an inch and a half into the rectum and held in position for the required time. Care must be taken that the child does not move or kick and so break the thermometer.

If a temperature is being taken in this way in the ward, it is best to put aside a thermometer to be kept specially for the case. It must be well washed each time after use and kept in an antiseptic lotion.

Varieties of Temperature.

We have seen that the normal temperature of the human body is 98·4° F. In health it varies very little in the twenty-four hours. As a rule it is lowest in the early morning and highest about five in the evening.

In disease we have great disturbance of temperature. It may be abnormally low or abnormally high.

A low temperature is spoken of as subnormal and is met with in conditions of shock or collapse as the result of an accident or after a surgical operation. In chronic wasting diseases the temperature often registers two or three degrees below normal. Alcohol, though it flushes the skin, always lowers temperature.

Fever is a condition in which the temperature of the body is abnormally high.

There are three types of fever.

1. *Continued Fever.*—When the temperature rises and keeps at a high level day after day with very little variation.

2. *Remittent Fever.*—When there is a very marked difference between the morning and evening temperatures, generally about two degrees, but it never at any time falls to normal.

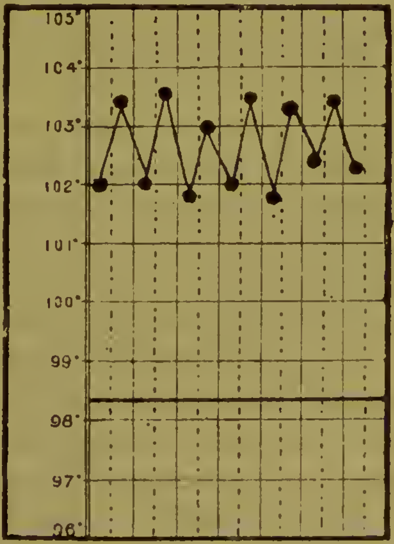


FIG. 2.—Type of Continuous Fever

3. *Intermittent Fever.*—When the fever is present during a part of the day, but the temperature falls to normal for a short time in the twenty-four hours.

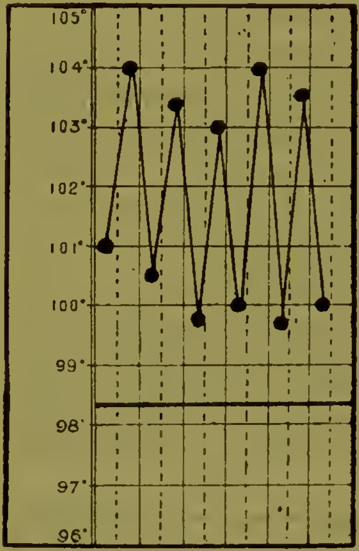


Fig. 3.—Type of Remittent Fever.

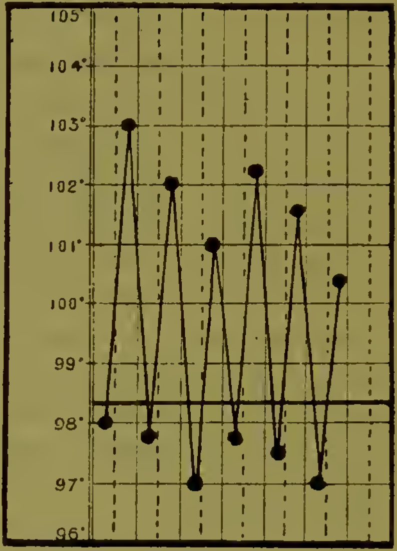


Fig. 4.—Type of Intermittent Fever.

With a rise of temperature a patient is said to have pyrexia; a temperature of 102° F. is moderate pyrexia, 104° to 105° F. is severe pyrexia, and if it reaches 106° F. there is hyperpyrexia. This hyperpyrexia or abnormally high temperature is met with in cases of heat-stroke and occasionally as a complication of acute rheumatism.

A rise in temperature often indicates the onset of the specific fevers, measles, scarlet fever, typhoid, etc., or it may show that there is some inflammatory condition, such as pneumonia (inflammation of the lung) or synovitis (inflammation of the synovial membrane of a joint) or septic inflammation of a wound.

If the nurse gets an unexpected temperature in any patient she should take it again with another thermometer in order to verify it, as the first thermometer may have been faulty. It is well for the nurse to remember that neurasthenic or malingering patients have been known to rub up the bulb of the thermometer or to place it on a hot-water bottle or hot poultice and so produce an alarming temperature. If there is any suspicion of such a thing it is wise to take the temperature again and to hold the glass while it is in the axilla.

Rigors.—A rapid rise of temperature is often accompanied by a rigor, and this is a symptom which a nurse must take particular note of. A rigor is a shivering fit of varying severity; the shivering may be slight or it may amount to severe shaking, when the teeth chatter and even the bed shakes. The fit lasts for a few minutes or may be prolonged to half an hour, the patient complaining of cold though the body temperature is rising rapidly.

A rigor is the beginning of many acute conditions. Many of the specific fevers are ushered in by a rigor. When a rigor occurs in the course of an illness, it generally denotes that there is some complication, *e.g.* perforation of the intestine in typhoid fever, and puerperal fever after child-birth.

The temperature of the patient should be taken as soon as it is safe to use a thermometer after a rigor and again in half an hour. The patient should be given hot blankets, hot-water bottles and hot drinks. The length of time the shivering fit lasts and its severity should be noted.

As a rule children do not have rigors. Acute illnesses in their case often begin with convulsions.

THE PULSE.

The pulse is the movement due to the alternate expansion and contraction of the arteries at each beat of the heart. This movement is present in all the arteries, but for convenience it is taken in the radial artery at the wrist, because there the artery is near the surface and can be felt easily and conveniently. It is sometimes taken in the temporal artery in nursing babies or in cases where both wrists are covered with dressings as in scalds or rheumatism. Anæsthetists often take the pulse at the facial or temporal artery.

The character of the pulse is a very important indication of the condition of the heart, and the nurse must accustom herself to detect the variations of it in health as well as in disease.

What has to be ascertained is:—

1. *the rate* at which the heart is beating;

2. *the regularity* with which it is beating;

3. *the strength or weakness* of the heart's action as shown by the tension or force of the pulse.

1. *The Rate.*—The normal pulse rate is 72 beats per minute but anything between 60 and 80 beats is within the range in health. The rate varies with the position of the person, being slower when the patient is lying down and quickened by standing or taking exercise. It is also affected by age. In the first year of life the rate is from 112 to 130 beats per minute; at the age of six it has decreased to 100, till in adult life we have the normal rate of 72 beats per minute. In old people it tends to rise a little.

2. *The Regularity.*—Having counted the number of beats, the next point is to note the regularity of the beats, that is whether the interval between them is of uniform length.

3. *The Strength.*—The force or tension with which the artery pulsates under the fingers is the third point to note.

To Take the Pulse.—Place the tips of the three first fingers along the artery, supporting the arm with the thumb underneath, or place the patient's wrist in the palm of your hand and bring the three fingers round on to the artery. The beats should be counted for a full minute by means of a watch with a second hand. When the nurse is more experienced she can count it for half a minute and then double the number of beats. A pulsometer is sometimes used instead of a watch because of its cheapness. It should be tested occasionally by a watch to be sure it is quite accurate. The nurse should take every opportunity of making herself familiar with the pulse in its normal condition, so that she may be able to appreciate the differences met with in disease. The pulse rate of a child should never be taken while it is crying.

Variation in the Pulse.

1. *The Rate.*

A frequent or quick pulse is met with in most cases where there is a rise of temperature, also in cases of great weakness and in failure of the heart. A sign that the heart is failing is when with a temperature which remains low or is falling steadily, we find a pulse that gets quicker every day.

A slow pulse is common in cases of convalescence from any of the acute fevers, in aortic stenosis, in congestion and compression of the brain, and is one of the symptoms to be watched for in cases of diphtheria as it may indicate heart failure.

A Running Pulse.—When the rate is over 170 beats per minute, there is some difficulty in counting it accurately. This is called a running pulse and occurs in children with fever and in critical cases. A pulse over 170 should be charted with a query mark before it to show the nurse has tried to be accurate, but is uncertain as to the number of beats.

2. *The Regularity.*

An intermittent pulse is one in which a beat is dropped occasionally. It should always be reported, though frequently it is not a serious symptom, being due to some digestive disturbance or to excessive smoking.

An irregular pulse is one in which the beats vary in their regularity and also in their force. It is met with in certain forms of heart disease and in tubercular meningitis.

A dicrotic pulse is one where each beat is followed by a second or smaller beat which is only an echo of the first, due to the imperfect filling of the artery with blood. The second beat should not be counted. In the late stages of typhoid fever, we sometimes get the dicrotic pulse.

3. *The Strength.*

A full or large pulse is one that feels larger than normal under the fingers and is met with in most fevers.

A small or feeble pulse is when the beat feels smaller than is usual, showing that only a small amount of blood is being forced into the artery by each contraction of the heart. It is a sign of heart weakness.

A hard pulse.—When there is high tension and it is difficult to stop the beating by pressure with the fingers. It is characteristic of kidney disease.

A soft pulse.—When there is low tension and the pulsation is easily stopped by pressure. We find it in severe cases of typhoid fever.

A thready pulse is a sign of great prostration and is an exaggerated form of the small pulse.

THE RESPIRATION.

The rate of the respiration is counted in all acute cases. The normal rate is from fifteen to twenty times in a minute, that is, one respiration to every four beats of the pulse. At birth an infant's respirations are about forty and at five years of age about twenty-five.

Taking the Respirations.

It is important that the patient should not know that the respirations are being taken, as he will involuntarily quicken them. The best way to avoid this, is for the nurse to keep on holding the patient's wrist as if still taking the pulse rate, while the number of movements of the chest is being quietly counted. This is done by marking the rise and fall of the chest or by counting the number of times the nostrils dilate. In children it is advisable to place the hand on the chest or abdomen and count the movements in that way. The respirations should be counted for a full minute as they are often irregular even in that time. Women use their chests in breathing more than men, whose breathing is much more abdominal. It is well for a nurse to remember that in diseases of the chest the breathing will be more abdominal to avoid the pain consequent on the movement of the chest, while in abdominal cases, like peritonitis, the muscles of the chest are used more to lessen the pain that would be caused by movement of the abdominal muscles and diaphragm. The nurse should train herself to detect differences in breathing, so that she will be able to notice a change even in the dark.

The points to note in taking the respiration rate are :—

1. Whether the respirations are rapid or slow.
2. Whether the respirations are shallow or deep.
3. Whether the respirations are noisy or quiet.
4. Whether there is any irregularity.

Varieties of Breathing.

Rapid breathing indicates that there is some obstruction which is making the breathing difficult—it may be mucus as in bronchitis, or congestion of part of the lung as in pneumonia, in which disease the rate of breathing is sometimes increased to 50 or 60 per minute.

Slow breathing is met with in most head cases, especially in congestion of the brain.

Shallow breathing occurs in pleurisy when small breaths are taken to avoid the pain caused by movement of the chest wall.

Stertorous breathing or snoring breathing occurs in comatose (unconscious) patients, *e.g.* in apoplexy.

Dyspnœa or difficult breathing is a very common symptom in diseases of the respiratory tract.

Orthopnœa or "upright breathing" is the difficult breathing we see in heart disease when the respirations are so prolonged and so distressing that the patient cannot breathe in a recumbent position, but must be propped right up in bed or even allowed to sit out in a high-backed chair.

Stridor is a rough hissing noise in respiration caused by some obstruction in the air-passages such as membrane in the larynx in diphtheria or pressure on the trachea by a tumour.

Sighing breathing or air-hunger is a symptom of internal hæmorrhage and must always be noted by a nurse and watched for in such cases as typhoid fever, or after an abdominal operation. There is no dyspnœa, but the breathing is quickened and is sighing in nature.

Cheyne-Stokes respiration is a peculiar type which occurs in cerebral cases, in some diseases of the heart and in uræmia. It often presages the approach of death, but has been known to last for a considerable time. It is characterized by the successive respirations getting gradually deeper and deeper till a maximum is reached, after which they decrease till there is a complete pause of several seconds, after which there is another period of gradually deepening respirations followed by diminishing respirations and another pause. The whole cycle is completed in about two minutes.

Charts and Charting.

The temperature chart records the morning and evening temperature or four-hourly temperatures, the pulse and respiration rate, the number of motions of the bowel, and the amount of urine passed. A space is left for the name of the patient, the disease he is suffering from, and the result.

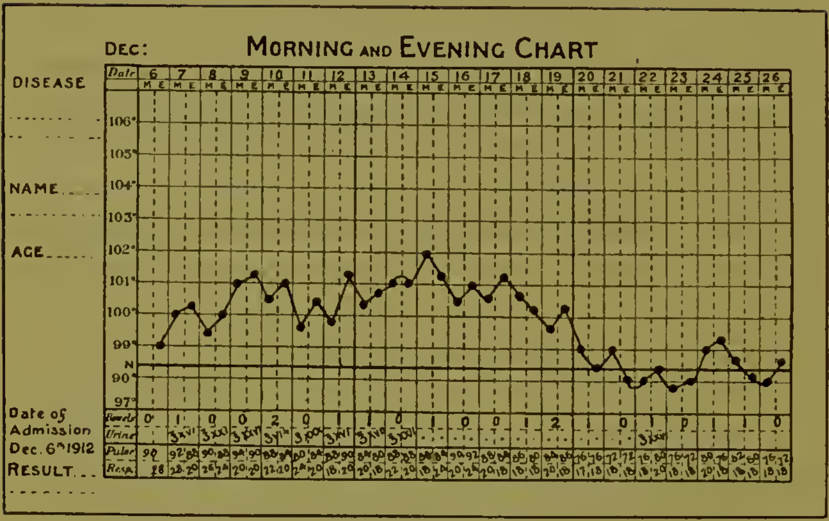
The charting must be done very neatly and accurately. In some hospitals, the details are all put in a book for the purpose and the sister of each ward does her own charting. Other institutions allow each nurse to chart the records she has taken, but the result is not always satisfactory as regards tidiness.

The point at which the temperature stands is indicated on the chart by a small dot, and the intervening lines which join the dots should be evenly drawn and should not be too heavy.

The two charts in common use are the morning and evening chart and the four-hourly.

Observation of the Patient.

A nurse is never asked to diagnose a disease, but she may be of great assistance to the doctor by observing minutely and accurately the condition of the patient.


DEC:
MORNING AND EVENING CHART
DISEASE
NAME
AGE
Date of Admission Dec. 6th 1912
RESULT
Date
M E
6
7
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10
11
12
13
14
15
16
17
18
19
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21
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23
24
25
26
106°
105°
104°
103°
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101°
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N
98°
97°
Bowels
Urine
Pulse
Resp.

FIG. 5.

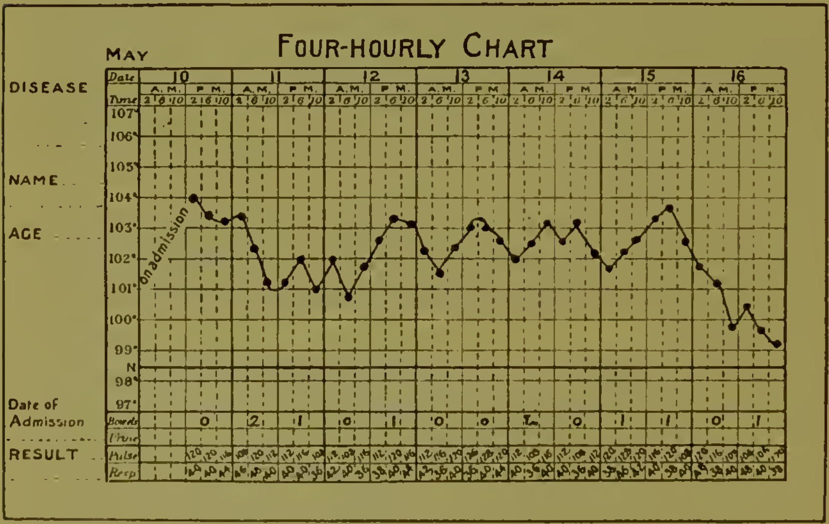
MAY
FOUR-HOURLY CHART
DISEASE
NAME
AGE
Date of Admission
RESULT
Date
Time
A.M.
P.M.
10
11
12
13
14
15
16
2 6 10
107°
106°
105°
104°
103°
102°
101°
100°
99°
N
98°
97°
On admission
Bowels
Urine
Pulse
Resp.

FIG. 6.

The main points to notice are :—

1. *The Position or Attitude of a Patient in Bed.*—A patient who lies comfortably in bed and can change his position without difficulty is in all probability not seriously ill. One who sinks low in the bed and lies helplessly in any position he is put in is in a very weak state, as in the late stages of a specific fever like typhoid. In peritonitis, the patient lies on his back with the knees drawn up to take the strain off the abdominal muscles and so to lessen the pain. Again in certain forms of heart disease the sufferer has to be propped up in a sitting position and in other forms he leans forward resting his head and arms on a bed-table or some support. In pleurisy a patient lies on the affected side and so allows the unaffected lung free movement. When there is rigidity of the muscles at the back of the neck, as in meningitis, the head is bent backwards. In renal colic the patient tosses from side to side in a futile search for a comfortable position.

2. *The Face and Expression.*—A *flushed* face denotes fever, and pallor of the face is an indication of hæmorrhage or shock. *Puffiness* of the face is a symptom of kidney disease. *Blueness* called *cyanosis* is due to insufficient aeration of the blood and is met with in failure of the heart and in laryngeal obstruction, in bronchitis and many other conditions. Congenital malformation of the heart produces this blueness in babies. They are generally spoken of in hospital as "blue babies". Yellowness may be due to pernicious anæmia or jaundice.

An *anxious* expression is seen in critical cases, especially in heart affections and abdominal disease. In children it is common if they have severe diarrhœa and vomiting.

A type of expression of the face in which the colour is dusky, the eyes are dull and sunken and the nose looks pinched, the chin sharp and the ears cold is called the *facies Hippocratica*. It may be seen in patients dying of acute abdominal disease or from some long wasting illness.

The *typhoid facies* is marked by dull lustreless eyes, trembling lips and a blank expression accompanied by muttering delirium.

3. *The Tongue.*—The condition of the tongue is an important symptom in many diseases. It may be covered with fur of a whitish or brown colour as in fevers and in cases of carcinoma of the stomach. The "strawberry tongue" of scarlet fever in which the tongue is furred with the papillæ showing prominently should be noted by the nurse as it is a help to diagnosis. In diabetes the tongue is large and looks like raw beef. It should also be noted whether the tongue is dry or moist.

4. *Cough.*—Cough is a symptom of most diseases of the lungs and of some other diseases. The points to note are its duration and frequency, whether it comes in paroxysms or is short and sharp, and whether it is worse at certain times of the day and night. The character of the sputum should also be noted.

The following list gives the more common kinds of cough met with in different diseases with the character of the sputum when there is expectoration :—

Disease.	Kind of Cough.	Character of Sputum.
Bronchitis	In early stage dry and tight In later stage easier and looser	Thin frothy mucus More profuse and muco-purulent
Pneumonia	Hard and painful	Scanty—very tenacious—rusty-coloured from being tinged with blood
Bronchiectasis		Dirty grey colour with fœtid odour
Phthisis	Easy in the early stages then harder and more painful, sometimes called "hacking"	Purulent of a greenish-yellow colour — may be streaked with blood. In the later stages it is nummular or coin-shaped
Laryngitis	Shrill and husky	Small plugs of mucus
Whooping cough	Convulsive short coughs followed by a whoop	Tough mucus, followed by vomiting
Croup	Barking or husky, followed by crowing inspiration	No expectoration
Diphtheria of the larynx	Noisy and brassy with stridulous breathing	,, ,,
Hysteria	Incessant and barking	,, ,,
Aneurism of aorta	Brassy or clanging	,, ,,

5. *Vomiting.*—Vomiting may be caused by disease of the stomach, of the intestines, or by irritation through coughing. It is often reflex and one of the first signs of acute abdominal disease in which "the stomach speaks for the whole belly," e.g. appendicitis. In gastric cases the vomiting is usually preceded by pain and discomfort after taking food. In cerebral cases there is no pain or discomfort and the vomiting is in no way connected with taking food. The nurse must note how often the patient vomits, whether it was after taking food, how much was vomited and its character, and

whether the pain was relieved when the vomited matter was brought up. Anything unusual in the way of vomited material should be saved and shown to the doctor.

In gastric ulcer, the vomiting generally occurs within half an hour of taking food ; in duodenal ulcer it is longer, usually three or four hours after. In dilatation of the stomach the vomit is often copious and sour-smelling from retention and fermentation. In intestinal obstruction, the vomited matter is first the contents of the stomach, then bilious in character and finally becomes fæcal, i.e. consists of the contents of the bowel.

Vomiting is often a symptom in the onset of the infectious fevers and of phthisis. Frequent vomiting is one of the symptoms of intestinal obstruction and of strangulated hernia.

Vomiting of blood is described under Hæmorrhage, Lecture X.

6. *Sleep.*—Sleep is very necessary to the sick person and it is an important point for the nurse to notice. The amount of sleep a patient has had is a subject on which the nurse and patient seldom agree. The patient generally asserts that he has not slept at all, while the night report states that he slept for several hours. The nurse should record the length of time in exact hours and minutes in serious illnesses, also the nature of the sleep, whether sound or restless. Do not use expressions such as "Slept well," "Did not sleep much" in writing reports. An accurate statement of the time is necessary.

7. *Delirium.*—Delirium is often present as a complication of disease and is of two kinds.

(*a*) *the low muttering type* as seen in grave cases of typhoid fever.

(*b*) *the active, noisy, maniacal type* met with in patients who have been hard drinkers and have come into hospital suffering from severe shock from an accident, or at the onset of pneumonia or other acute disease.

In one form of delirium the patient moves his hands restlessly about, constantly pulls at the bedclothes and tries to catch at something in the air. This is generally a bad sign, though patients have been known to recover. It indicates that the nervous system is much disturbed by the disease.

Delirious patients must be constantly watched as they often attempt to get out of bed and may do themselves an injury.

A condition of *coma* or complete insensibility is a grave symptom which occurs in certain diseases and in poisoning by certain drugs.

8. *The Amount and Character of the Excretions.*—These must be carefully noted and reported. They are dealt with in a subsequent lecture under "Observation of the Stools and Urine and the Testing of Urine".

GIVING AND WRITING REPORTS.

The day nurses generally give a verbal report of the patients under their care to the ward sister who is responsible to the physician or surgeon. As a rule the night nurses, besides giving a verbal report, write all details in special report books, which can be referred to if necessary.

In such reports it is usual to record the amount of sleep the patient has had, the amount of nourishment taken, the amount and character of the excretions, any complaint of pain and how long the pain lasted. The fact that a dressing was "through" and had to be packed, or that flatus had been passed after an abdominal operation, should always be noted. The appearance of a rash, or anything that will help the doctor in his diagnosis or treatment should be included. These observations should be written in a concise and clear way and no "clipped" terms used. It is quite as easy to write operations as "ops," or fomentations as "foments". A well-written night report is an official document which may be referred to at any moment and should be a true and accurate statement of the observations of the nurse. It should be signed by her. In cases where the patient is very seriously ill, a special hourly chart is of the greatest use to both the day and the night nurse. It records the amount of nourishment taken, with the hour, the times at which medicine or stimulant was given, the amount of sleep, with a space for any further information.

Name *Age* *Date*

Time.	Milk. oz.			Brandy dr.	Medicine dr.	Sleep.		Extras.	Remarks.
						Hour.	Min		
8 a.m.									
9 ,,									
10 ,,									
11 ,,									
12 noon									
1 p.m.									
2 ,,									
3 ,,									
4 ,,									
5 ,,									
6 ,,									
7 ,,									
8 ,,									
9 ,,									
10 ,,									
11 ,,									
12 nt.									
1 a.m.									
2 ,,									
3 ,,									
4 ,,									
5 ,,									
6 ,,									
7 ,,									
Total									

FIG. 7.—Hourly Report Chart.

LECTURE V.

Enemata—Surgical Cleanliness—Catheters and Catheterization—Douches.

ENEMATA.

An enema is a liquid preparation injected into the bowel.

Enemata are given for several purposes.

1. *To produce an action of the bowels*, i.e. purgative enemata.

2. *To feed the patient*, i.e. nutrient enemata.

3. *To stimulate the patient*, i.e. stimulating enemata.

4. *To relieve pain*, i.e. sedative enemata.

5. *To kill worms*, i.e. anthelmintic enemata.

6. *To reduce spasm and relieve flatulence*, i.e. antispasmodic enemata.

Generally speaking they are of two kinds.

(*a*) *Those to be returned* which are usually given with a Higginson's syringe to which a rubber catheter (No. 12) may be attached; the fluid is injected at a temperature of 98° to 100° F.

(*b*) *Those to be retained* which are given with an apparatus consisting of the barrel of a syringe to which tubing and a rubber catheter (No. 8) is attached. These are given at a temperature of 95° F.

Position of the Patient.—The patient lies on the left side with the knees drawn up and the buttocks towards the edge of the bed. Protect the bed with a mackintosh and bath-towel or draw-sheet. The enema is administered under the bedclothes without exposing the patient in any way. In some cases, as after abdominal operations or in injuries to the spine, it is necessary to give the enema with the patient lying on his back, so the nurse should accustom herself to giving it in this position.

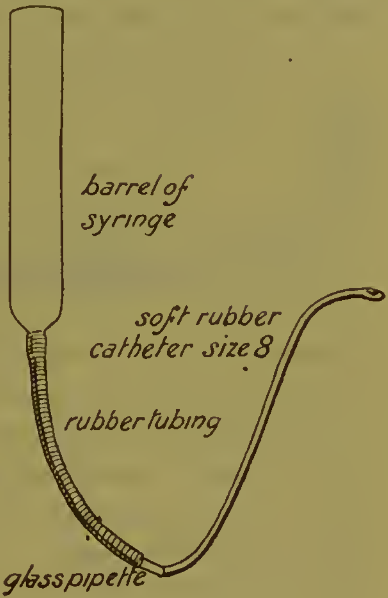

FIG. 8.—Nutrient Apparatus.

Kinds of Enemata and Their Administration.

1. *Purgative Enemata.*—(*a*) *The enema saponis* or soap and water enema is the one most commonly given for the purpose of emptying the bowel before an operation or examination and also to relieve constipation. The fluid is prepared by dissolving soap (yellow or soft soap) in warm water in the proportion of one ounce of soap to every pint of water. The solution is then poured into a bowl into which the Higginson's syringe is placed and the air expelled from it by pumping the fluid through it. The catheter is then lubricated with vaseline and passed 6 or 8 inches up the rectum and fluid is then slowly injected by working the bulb continuously till the fluid is all injected. If no catheter is attached to the syringe, the bone nozzle must be well oiled and passed in as far as the shield. The

amount of fluid injected is generally one to one and a half pints for an adult. For children up to ten years, about two ounces for each year of age is a safe quantity. Have a bedpan in readiness and urge the patient to retain the enema for a few minutes before returning it.

(*b*) *A simple enema* consists of warm water at a temperature of 95° F. It is used for washing out the bowel once every day when the patient is being fed by nutrient enemata.

(*c*) *Olive oil enema* is given in cases where there is extreme constipation or when it is necessary to soften the fæces as a preparation for rectal operations. The oil is heated to 95° F. and from six to ten ounces are injected into the rectum by means of the nutrient apparatus described above. Six or eight hours should elapse before a large soap and water enema is given, the interval being required for the oil to soften the hardened fæces.

(*d*) *A castor oil enema* is supposed to be more effectual as a purgative than a soap and water enema. One ounce of castor oil is mixed with ten ounces of starch mucilage and run into the bowel by means of the nutrient apparatus. It is followed in half an hour by an enema saponis, or the ounce of oil may be mixed with the soap and water enema and injected by means of a Higginson's syringe.

(*e*) *Glycerine enema* is given with a special vulcanite syringe. The amount of glycerine injected is from one to four drachms, half a drachm being enough for infants. The prescribed amount is drawn up into the syringe, the nozzle of the syringe passed into the rectum and the glycerine injected by pressure on the piston.

2. *Nutrient Enemata.*—Rectal feeding is the method used to nourish the body when food cannot be given by the

mouth. It is resorted to in cases where the stomach requires rest, as in patients with gastric ulcer, or after abdominal operations when vomiting is excessive, and after tongue and mouth operations and when there is severe shock.

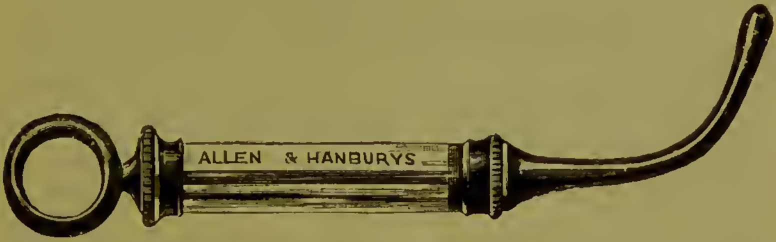

FIG. 9.—Glycerine Syringe.

Many different preparations are used, but as a rule whatever is given is peptonized before being injected into the bowel. The doctor generally orders the food and the quantity to be given. The usual constituents are peptonized milk and beef-tea. Sometimes eggs, arrowroot, gruel, port wine or brandy are ordered. A pinch of salt should be added to the mixture. The quantity to be given varies (from 4 to 8 ounces), and the enema is given four hourly or six hourly as ordered.

A nutrient enema is given with the apparatus already described, and must be given slowly otherwise it will be returned.

A soap-and-water enema must always be given to clear the bowel of fæces before beginning this method of feeding, and once a day a simple enema is used to get rid of the unabsorbed material.

The apparatus should be taken to the bedside in a basin of warm water. The mixture to be used is placed in a graduated measure jug and carried in a pannikin of hot water. The end of the catheter is lubricated with vaseline and passed into the rectum, the food being run in very slowly. After use the barrel and tube must be well washed by allowing water to run through it and when clean should be kept in a solution of boracic acid till again required.

The gravitation or drip enema is sometimes used. By this means a largor quantity—as much as a pint or more—of food may be given. The food, prepared in the usual way, is placed in a douche can to which a long tube is attached. The fluid is allowed to trickle into the bowel, the flow being regulated by means of a clamp or a bull-dog forceps. It takes an hour or more for a pint to be administered in this way, and the enema is repeated every eight hours. Saline solution may be given in the same manner.

3. *Stimulating Enemata.*—The most easily prepared and the one in common use consists of one drachm of common salt in a pint of water at a temperature of 98° F. It is frequently used in cases of collapse during or after operations. An ounce of brandy is sometimes added to the saline solution by order of the surgeon.

In opium-poisoning a stimulating enema of strong black coffee and brandy may be ordered. The coffee is made very strong, is strained through muslin and added to the brandy, and injected slowly into the lower bowel by means of a glass funnel and small catheter. The quantities used are 8 or 10 ounces of coffee and 1 to 2 ounces of brandy. The fluid should be administered at a temperature of 100° F.

4. *Sedative Enemata.*—These are given to relieve pain and to check diarrhœa. The most usual one consists of starch and opium—2 ounces of thin starch, not too warm, to which the prescribed amount of tincture of opium (laudanum) generally thirty minims has been added. This is injected by means of the funnel and catheter.

Sedative medicines, such as bromide and chloral are sometimes given by rectum when the patient is unable to take them by mouth.

Iced water may be ordered to be given as an enema in hæmorrhage of the bowel or in cases of sunstroke.

5. *Anthelmintic Enemata.*—Anthelmintics are drugs which are used to kill worms. Common salt (1 drachm to a pint of water) or infusion of quassia (5 or 6 ounces) are injected into the rectum to destroy threadworms in children.

6. *Antispasmodic Enemata.*—The antispasmodic enema is used to relieve flatulence and abdominal distension after operations or in typhoid fever. One ounce of turpentine is mixed with from 2 to 4 ounces of starch mucilage and injected slowly into the rectum by means of the nutrient apparatus. Another method of administering is to add the turpentine to an ordinary soap-and-water enema and inject it with a Higginson's syringe.

Asafœtida given in the form of an enema is sometimes ordered; 2 to 4 drachms of tincture of asafœtida are added to 4 ounces of thin starch and injected into the bowel. The odour of the asafœtida is very pungent, resembling that of garlic.

The Enema Rash.

Occasionally an erythematous eruption occurs after a patient has had a purgative enema of soap and water. As a rule it causes no discomfort and fades away in a few hours.

SURGICAL CLEANLINESS.

Surgical cleanliness means much more than personal cleanliness. By personal cleanliness we mean freedom from dirt, but surgical cleanliness aims at freedom from germs or bacteria.

Bacteria are minute organisms of the lowest order of vegetable life which are only visible under high powers of a microscope. They abound everywhere, on a person's clothes, food, and in the air we breathe. Some are harmless, others are very poisonous, and when they are introduced into the body produce diseases like typhoid fever and pneumonia, or set up inflammation and suppuration.

More will be said of these bacteria in a subsequent lecture, but it is necessary for the junior nurse to understand that absolute cleanliness is essential to prevent the introduction of these germs into a wound or into any organ of the body, such as the bladder in passing a catheter, or into the pleural or peritoneal cavity when exploring for fluid.

These organisms are killed :—

1. *By heat*—by boiling, steaming, or baking.

2. *By chemicals*—antiseptics such as carbolic acid, lysol, boracic acid, mercury, etc.

The instruments that are to be used are boiled for twenty minutes and are placed in sterile water or in boracic lotion. The swabs or sponges are sterilized by steam or by boiling. It remains for the hands of the doctor or the nurse to be sterilized. This is done by scrubbing the hands and arms to above the elbow with soap and hot water and a nail-brush, for at least three minutes. They are then rinsed in clean water and soaked for a few minutes in some chemical, such as carbolic lotion (1 in 60), or biniodide of mercury (1 in 2000). After the hands have been thus prepared nothing must be touched which is not sterile.

This short note on surgical cleanliness has been introduced here in order to impress upon the nurse the importance of absolute cleanliness in passing catheters. By want of care in these details she may cause germs to be introduced into the bladder which will set up inflammation (*cystitis*), a very painful complication of a patient's illness.

CATHETERS AND CATHETERIZATION.

Catheters are hollow tubes made of different materials and are used to empty the bladder. They are made of silver, glass, gum elastic and of soft rubber, and must be distinguished from bougies, which are very similar, but are solid, and are used for dilating the urethra. Each instrument has a number which indicates its diameter. The smallest is no. 1 and the largest no. 12 on the English scale.

Glass, metal, and india-rubber catheters may be sterilized by boiling for half an hour. They should then be placed in a flat dish in sterile water or a solution of boric acid.

The gum-elastic catheter will not boil and is ruined by being kept too long in carbolic lotion. To sterilize it—place it in a solution of carbolic acid (1 in 20) for five minutes, then transfer it to a flat dish containing sterilized water.

A gum-elastic catheter used in cases of enlarged prostate is bent at the eye end at an angle of 45 degrees. It is called a *catheter à coudée*, and if it has a double elbow—*bicoudée.*

The soft rubber catheters (Jacques') are numbered to indicate the diameter and are used for many purposes besides emptying the bladder;—a small size, no. 5 or 6, is used for nasal feeding; no. 8 or 9 for rectal feeding, and a no. 12 is fitted on to the end of a Higginson's syringe for use in administering enemata.

To Clean the Catheter after Use.—The greatest care must be taken in cleaning catheters. The glass, soft rubber or silver ones should be washed in cold water, allowing the flow of water from the tap to pass through the eye end first and then the other way. This should be repeated till it is quite clear. Then boil for half an hour and dry carefully.

To Clean the Gum-elastic Catheter.—Wash in cold water in the same way as the others, and when quite clean soak in carbolic lotion (1 in 20), or perchloride of mercury (1 in 500), for five minutes, or wash through the catheter with this lotion by means of a syringe; rinse the catheter in sterile water and dry.

To Pass the Catheter.

1. *Female.*—Having boiled the catheter, a glass one if possible or failing that a Jacques' soft rubber one (size 8), place it in a bowl of sterile water or boracic lotion. Have at hand a bowl containing swabs, and some disinfectant lotion, a porringer to receive the urine and if a rubber catheter is used some sterilized lubricant such as olive oil or glycerine.

The patient is placed on her back with the knees drawn up and the bedclothes arranged, a blanket over the chest of the patient and the upper bedclothes turned down. The porringer is placed between the knees to receive the urine. The nurse then scrubs her hands as previously described, and, pushing the lower bedclothes out of her way with her elbow, separates the labia with the fingers of her left hand while with the right she swabs the external genitals with a disinfectant solution, swabbing from above downwards. Should the catheter be passed by mistake into the vagina, it must be again sterilized or a fresh sterile one used. It is a good plan for junior nurses to always place a swab in the vaginal opening to prevent this mistake. If there is any vaginal discharge such a precaution should be taken before passing a catheter.

The catheter is then passed into the opening of the urethra and the other end into the porringer in the bed. If the urine ceases to flow withdraw the catheter a little or change the position in some degree, when it will probably flow again. When the urine has ceased to run remove the catheter, wash the parts and replace the bedclothes. In removing the catheter place the finger on the end so that no drops of urine fall on the bed. The quantity of urine drawn off should be measured.

2. *Male.*—Catheterization of male patients is as a rule done by the doctor. If the nurse has to perform this duty on a male patient a soft catheter should be used. The same procedure as in passing it on a woman is gone through. The catheter should be lubricated by dipping it in glycerine, and having swabbed the orifice of the urethra, hold the penis with the left hand and pass the catheter in gently and without any force till the urine flows.

Washing out the Bladder.

This is necessary when there is cystitis (inflammation of the bladder). In this condition the urine in the bladder has a smell like ammonia, and the patient has the desire to pass it often. When it is being passed a scalding severe pain is felt. The urine is decomposing and pus is present in it. In order to keep the mucous membrane clean, the bladder is washed out with sterile water or boracic lotion at a temperature of 100° F. Two or three pints of lotion should be prepared. A sterilized soft rubber catheter, no. 9 or 10, is passed, and the urine in the bladder is drawn off. A funnel with a piece of tubing and a pipette is then attached to the catheter and about 5 ounces of the lotion is poured slowly into the bladder and allowed to remain for a few minutes, the funnel is then lowered to allow the fluid to run back. This is repeated till the lotion comes back quite clear, generally about two pints of lotion being used.

Douches.

A douche is a jet of fluid directed with some force on an internal surface. It is given to clean out the cavity, to relieve inflammation and to check hæmorrhage. Those in common use are the vaginal, aural, and nasal.

1. *The Vaginal Douche* is much used in gynæcological nursing. To give a douche a douche-can or irrigator is fitted up with a long piece of rubber tubing to which is attached a glass nozzle, or it may be given with a Higginson's syringe to which a special nozzle is fixed. The can containing the lotion should be hung on the wall or held at a higher level than the bed. The patient lies flat on her back on a bedpan. The fluid, consisting of 3 or 4 pints of the lotion ordered, must be tested as to temperature, the ordinary douche being given at a temperature of 105° F. The nozzle having been sterilized by boiling if a glass one, and by soaking in antiseptic if vulcanite, is placed in a bowl of sterile water. A mackintosh or bath-towel is placed below the patient, who is then raised on to the bedpan. The nurse, having scrubbed her hands, swabs the vulva and vaginal orifice with a disinfectant solution. Before the nozzle is passed into the vagina, the lotion should be allowed to run through the tube till it is warm; the nozzle is then passed for about three or four inches upwards and backwards towards the posterior wall of the vagina. The lotion is allowed to flow until the can is empty. The patient is then dried and a towel placed below her in case any fluid

drains away afterwards. A nozzle should be kept for each patient who is having douches. After use it should be well washed, boiled, and stored in a solution of carbolic acid till it is required again.

The lotions most used for vaginal douching are: Lysol (1 drachm to the pint), tincture of iodine (1 drachm to the pint), or biniodide of mercury (1 in 4000).

The Intra-Uterine Douche is never given by the nurse, but is done by the doctor. It is administered by means of a special intra-uterine douche nozzle attached to a douche can or irrigator. The nozzle is sterilized by boiling.

2. *The Aural Douche* and *Nasal Douche* are used in the same way. A vessel containing lotion at 95° F. is placed above the level of the patient. To the vessel is attached a long piece of tubing with a stop-cock and nozzle. The nozzle is placed just inside the nostril or ear and the lotion is allowed to flow, being regulated by means of the stop-cock.

If a nasal douche is being given the patient should bend over a basin and breathe with the mouth open. The lotion will then go up one nostril and come back down the other.

If the douche is for the ear, the nurse must be careful to direct the fluid upwards into the passage of the ear so that it does not strike the drum directly, but is directed on to the roof of the meatus first so that the force is broken before reaching the drum.

LECTURE VI.

Observation of Stools.—Urine and Testing Urine.

OBSERVATION OF STOOLS.

ONE of the earliest duties of the probationer is to give bedpans to the patients. Before emptying a bedpan she must be careful to notice whether there is anything unusual about the motion. Should she note any peculiarity the attention of the staff-nurse or sister should be drawn to it, and they will decide whether it is necessary to keep the stool for the doctor's inspection.

The points to be noticed about the discharge from the bowels (fæces) are the consistency, colour, frequency and amount of the excretions, whether there is anything abnormal in the stool or if there is any pain in passing it.

1. *The Consistency.*—The motions may be unformed and loose, as in diarrhœa, or in hard, round masses, called scybala, as in constipation. They may be of the colour and consistency of pea-soup in typhoid fever, or may look like water in which rice has been boiled (rice-water stools) in cholera. The stools of a patient suffering from dysentery contain very little fæcal matter but consist almost entirely of mucus and shreds of mucous membrane and blood. They are very foul-smelling. In obstruction of the large intestine, the stools are sometimes ribbon-like.

2. *The Colour.*—This varies very much. In jaundice the

stools are whitish or clay-coloured owing to the absence of bile. In typhoid they may be of a yellowish colour and of the consistency of pea-soup, while in cases of infantile diarrhœa the stools are green. Black and tarry stools are met with when blood has passed through the stomach or intestines, as in severe nose bleeding or in bleeding from gastric or duodenal ulcers. This blood is acted upon by the gastric juice and turned black. The passage of this blood is called *melæna.* In hæmorrhage, which is a complication of typhoid fever, the blood passed is bright red in colour and comes in large quantities. In any case where the slightest tinge of blood is seen in a stool, the nurse should be on the alert, as a fatal hæmorrhage may ensue. Blood in the stools if bright in colour may be from a pile or an ulcer in the rectum. In children the passing of blood and mucus by the rectum should at once be reported, as it may mean that the child has an intussusception. The stools in intussusception may resemble red-currant jelly.

The nurse should note that certain drugs such as bismuth, iron and lead turn the motion black, and should ascertain whether the patient is having any of these medicines before reporting the stools to be melænal.

3. *The Frequency and Amount of the Motion.*—The normal healthy person has an action of the bowels once a day. In constipation there may be no action for three or more days while in diarrhœa there may be many motions in the twenty-four hours and these are of a loose consistency. The number of actions of the bowel must be regularly noted and charted. The average amount of fæces in health is about 4 ounces.

4. *Anything Abnormal.*—Undigested food is often seen in stools in the form of curds of milk, and skins or pips of fruit.

Gallstones are sometimes passed. If this is suspected the fæces must be searched for the stone by being washed well through a sieve. Children sometimes swallow foreign bodies, such as buttons, coins, or small toys. If the foreign body has passed into the stomach no aperient should be given ; the child if old enough should have a stodgy diet of porridge or bread and milk, so that the article may be impacted in the mass and pass through the intestines without injuring them.

Worms of various kinds are also passed in the stools, and these the nurse must always note ; the threadworm and segments of a tape-worm are the most common. The round worm is not often found.

5. *Pain.*—Pain in passing a stool is usually due to the presence of piles in the rectum, or to ulcers or fissure at the anus. The passing of hard scybalous masses also produces pain.

URINE AND URINE TESTING.

The Urine.—The urine in its normal condition is an amber-coloured fluid with an acid reaction. The normal specific gravity, i.e. the weight of the urine compared with an equal volume of water, is 1015 to 1025, water being taken as the standard 1000.

The points to notice about urine are—the quantity, colour, presence of sediment or of blood, pus, casts, or gravel, and whether there is any difficulty or pain during micturition.

1. *The Quantity.*—The normal amount of urine passed by an adult in twenty-four hours is 50 ounces. An infant secretes about 6 ounces and a child of ten 20 ounces. The amount is increased if large quantities of fluid are drunk, and after exposure to cold ; it is much diminished

if a person perspires freely. It is much increased or diminished in certain diseases. In diabetes the amount is considerably increased, 10, 15 or 20 pints being passed. The quantity is much diminished in acute nephritis and in most fevers as well as in cases of excessive diarrhœa. In order to find the quantity of urine passed in the day, the amount is measured each time of passing, a note taken of the quantity, and the total summed up and charted at the end of the twenty-four hours. If any urine is passed in a stool a plus sign (+) should be added to the total quantity to indicate this.

2. *The Colour.*—When the specific gravity is low, as in diabetes insipidus, the urine is very pale, almost like water. In fever it is passed in small quantities and is consequently much more concentrated and highly coloured. Certain drugs affect the colour of urine. Rhubarb makes it a deeper yellow, bile gives it a yellowish-brown or dark-brown tint, while methylene blue taken internally gives the urine a bright blue colour. If carbolic acid is taken internally or is absorbed so as to produce poisoning, the urine is of a greenish-black colour (carboluria).

3. *The Presence of Sediment, etc.*—This may be in the form of a fine powder or it may be stringy or ropy. If blood is present the urine has a smoky appearance. Pus in the urine indicates some inflammation of a part of the urinary tract such as pyelitis—inflammation of the pelvis of the kidney, or cystitis—inflammation of the bladder.

Casts are also passed in the urine. These are solid bodies too small to be seen without the aid of a microscope. If passed in sufficient quantity they form a sediment. Occasionally small stones or gravel are passed with the urine. In such cases the patient has much pain in the lumbar region.

4. *Pain in Micturition* or pain in passing urine should always be reported. It is often due to some disease of the bladder or to the presence of gravel.

How to Prepare a Specimen of Urine for Examination.

This is a duty that often falls to the probationer. The bedpan or urinal must be scrupulously clean as also the specimen glass in which the urine is placed. The specimen glass should be filled to within an inch of the top with urine and should be labelled with the name of the patient and the date. The mouth of the glass should be plugged with cotton wool, or a small cover of paper or jaconet made to fit over it. The specimen should be kept in a cool place as heat causes urine to decompose very quickly.

Sometimes a catheter specimen is asked for, especially in female cases. This is to avoid the urine being contaminated by vaginal discharge.

How to Examine the Urine.

The *specific gravity* has first to be ascertained. To measure this a urinometer is used. The urinometer is generally kept floating in a glass of cold water. The specimen should be cool before the specific gravity is taken. Put the urinometer into the urine and when it floats clear of the vessel read off the number on the stem at the level of the fluid. Be careful to wash the urinometer after use. The normal specific gravity is as we have seen 1015 to 1025, but the specific gravity varies in certain diseases.

The Reaction is next taken. Litmus paper is used for this purpose. If a blue litmus paper when dipped into the urine turns red the reaction is said to be acid. If the blue litmus paper remains unaltered, a red litmus paper should be used; should it turn blue the urine is said to have an alkaline reaction. If neither of the papers is affected the reaction is neutral.

Freshly passed normal urine is acid but becomes alkaline if left standing for a time.

Testing of Urine.

1. *Test for Albumen.*—(*a*) The *Heat Test.*—Fill a test tube to within an inch of the top with urine and boil the top of the fluid over a spirit lamp. If the specimen is acid and albumen is present, the albumen will coagulate and form a white cloud on boiling. On this cloud put a little acetic acid and if the white cloud disappears it was caused by phosphates, if it persists albumen is present.

(*b*) *The Cold Test.*—Pour a small quantity of the specimen gently on the top of some nitric acid in the test-tube. They will not mix and at the junction a ring of white precipitate will form if there is albumen in the urine.

2. *Test for Sugar.*—A small quantity of Fehling's Solution is placed in a test tube and boiled. If its colour is not changed by the boiling it may be used for the test. A few drops of urine are added to it and the mixture is boiled over a spirit lamp. If the blue liquid turns to a bright orange colour sugar is present.

Another method is to put a small piece of yeast in the specimen. If sugar is present the urine ferments and the specific gravity will be lowered.

3. *Test for Blood.*—Pour into the test-tube enough of the specimen to fill about one inch of the tube, then add a few drops of tincture of guaiacum; shake gently, then pour carefully down the side of the tube a little ozonic ether. Allow to stand for a few minutes and if blood is present a brilliant blue ring is formed at the junction of the two fluids.

4. *Test for Pus.*—Add a little liquor potassæ to the specimen containing the deposit. If pus is present it will become ropy. Mucus has much the same appearance as pus if it is present in urine, but is dissolved by the addition of liquor potassæ.

5. *Test for Bile.*—A drop or two of the urine is placed on a white dish and near it a drop of nitric acid is placed. At the point of meeting of the two fluids there will be a play of colours—green, blue, orange and red if bile is present in the urine.

6. *Test for Acetone.*—To one inch of urine in a test-tube are added half-an-inch of liquor potassæ and about the same amount of a solution of nitro-prusside of sodium. The mixture becomes red at first, but the colour soon changes to purple or violet-red when acetic acid is added, provided acetone is present.

Retention of Urine.

A patient is sometimes unable to pass urine. It collects in the bladder but is not voided. This condition is met with after operations, especially in rectal cases. If the patient has passed no urine twelve hours after operation or if he complains of a feeling of discomfort the nurse should report to the doctor. Hot applications over the bladder may be useful. In nervous patients the running of water from a tap has often the desired effect. If these remedies are not effective the doctor will probably order a catheter to be passed to draw off the urine.

Suppression of Urine.

This condition must not be confused with retention as it is a much more dangerous one. It means that the kidneys are not secreting urine and the bladder is empty.

It sometimes occurs in acute inflammation of the kidneys. Though the patient passes no urine, he has no discomfort or pain as in retention. When the condition is discovered the doctor must be informed at once, as immediate treatment is necessary.

Incontinence of Urine.

In this condition the patient loses all control and cannot retain urine in the bladder. It occurs in unconscious or partially unconscious patients, also in cases of paralysis. The nurse's duty is to keep the bed as dry and clean as possible, and to take all precautions to prevent the formation of bedsores.

LECTURE VII.

HOT AND COLD APPLICATIONS.

Methods of Applying Heat: Baths and Packs—Poultices and Fomentations—Methods of Applying Cold—Baths—Medicated Baths—Local Baths.

I.—The Application of Heat.

The application of heat to the body produces dilatation in the vessels of the skin and largely increases the quantity of blood which they contain. Heat may be applied either moist or dry and there are many methods of applying it. Hot baths or packs are among the most common, and are useful in such conditions as inflammation of the kidneys, muscular spasm (as in colic or infantile convulsions), insomnia, and in some instances for the relief of pain.

1. *Hot Baths and Packs.*

(*a*) *A Hot Bath* is given at a temperature of from 100° F. to 110° F. The heat of the water should be tested with a bath thermometer or failing that with the tip of the elbow, never by the nurse's hand which is much less sensitive.

(*b*) *Hot-air baths* are frequently ordered in some forms of kidney disease, and for them a special apparatus is necessary. Allen's apparatus is used without the boiler, and it will be found that by placing the stand on the top of the box containing it, the spout is just high enough to reach into the ordinary hospital bed. In arranging for a bath of this kind place a mackintosh and a blanket below the patient, remove his shirt and roll him in a warm blanket. Two wicker-work cradles are required. They are placed over the patient, covered with two blankets and a mackintosh, with another blanket on top of the mackintosh. They should be well tucked in under the mattress at the sides and under the patient's chin at the top. A bath thermometer is placed under them at the patient's neck, so that it can easily be watched during the bath. The spout of the kettle is inserted through the opening in the lower cradle and the lamp of the apparatus lighted. A damp piece of blanket should be wrapped round the end of the spout to prevent the blankets which are pinned round it getting scorched. Sometimes the spout of the apparatus is guarded by asbestos.

The bath is given at a temperature of from 115° F. to 150° F. and it should last for fifteen minutes after the skin has begun to act, unless the patient shows signs of faintness or exhaustion, when it should be stopped at once. A cloth wrung out of iced water is as a rule placed on the patient's head while the bath is in progress, and is changed frequently.

When the bath is over, the lamp is put out, the cradles removed, and the patient left between the blankets till he has ceased to sweat. He is then sponged down and dried, a warm shirt is put on and the bed is made up with dry blankets.

(*c*) *A vapour bath* is given in the same way; the only difference being that the boiler in the apparatus is used so that steam is introduced into the bed instead of hot air. The boiler should not be too full and the temperature of the bath is from 105° F. to 120° F. The same precautions are observed as in giving the hot-air bath.

(*d*) *A hot wet pack* is sometimes ordered in cases of dropsy and uræmia. Prepare the bed with a long mackintosh and blanket below the patient. Cover the patient with a blanket and remove the bedgown. Take a thin blanket or a sheet, fold in four crosswise and with the help of another nurse wring it out of hot water at a temperature of 115° F. The easiest way is to have a hot bath by the bedside. By the time it is wrung out and ready to apply the temperature will be 105° F.; wrap the patient up in it; cover with a mackintosh and put two or three blankets on top and tuck them all well in.

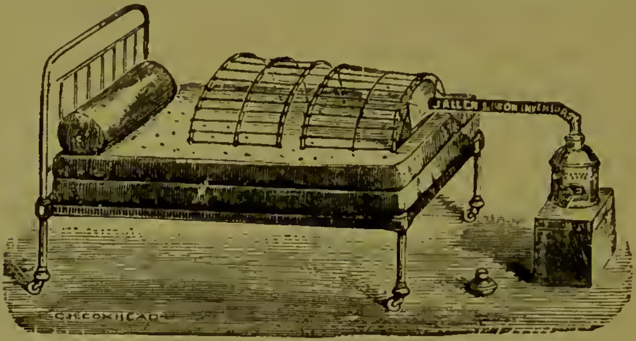

FIG. 10.—Apparatus for Hot Air or Vapour Bath.

The patient remains in the pack for twenty minutes or half an hour. The wet sheet and mackintosh are removed and a dry warm blanket placed round him and he is left for a short time. He may then be washed quickly with hot water, a warm shirt put on and his bed made comfortable.

(*e*) *A hot dry pack.*—To give this the patient is wrapped in several hot blankets to induce perspiration. This form of pack is ordered very often when the patient has been given pilocarpine (a drug which produces profuse sweating). After the pack is over, the patient must be dried and warmly clad.

In giving hot baths or packs certain precautions must be observed :—

1. To raise the temperature gradually.
2. To be careful not to burn or scald the patient.
3. To stop the bath on the first sign of faintness.
4. To guard the patient from chill.
5. Never to leave the patient alone while in the bath.

2. *Poultices and Fomentations.*

Poultices are another method of applying heat. The one in most common use is the linseed poultice.

(*a*) *To Make a Linseed Poultice.*—We require a kettle of boiling water, a spatula or table-knife, a jug filled with hot water to place the spatula in, a basin, a board or wooden table, a piece of old linen or some teased-out tow and a supply of linseed meal. These should all be at hand so that no time is wasted in making the poultice.

If linen is used for spreading the poultice on, it should be cut the size required and the edges cut out at the corners so that they will fold over neatly.

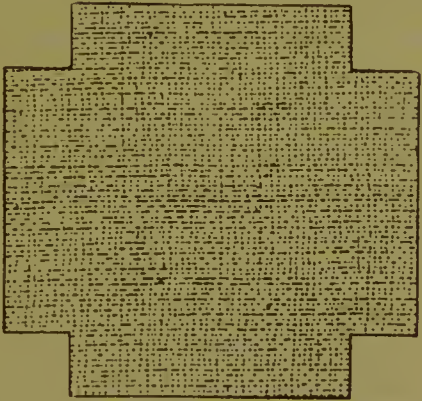

FIG. 11.—Linen cut for Poultice.

If tow is used it must be teased out flat and made about two inches larger than the size of poultice required, so that it may be rolled in at the edges after the poultice is made.

Heat the basin by placing it near the fire for some time or by rinsing it with boiling water; then pour a little boiling water into it and sprinkle in the crushed linseed with the left hand, while stirring with the spatula with the right. The mixture should be thick enough to come clean away from the sides of the bowl. Turn the mixture out and spread it evenly with the spatula, dipping the spatula in the jug of hot water to keep the linseed from sticking. Turn in the edges of the linen or roll up the tow to the margin of the poultice and carry it between hot plates to the bedside. If crushed linseed has been used it is unnecessary to smear the surface of the poultice with oil to prevent it sticking.

Apply the poultice as hot as it can be borne by the patient, cover it with a thick layer of cotton wool or a brown-wool pad and secure it by a bandage. If the poultice is for the chest, a many-tailed bandage is more easily applied and is less disturbing to the patient, and if for the abdomen, a flannel binder can be used.

Poultices should be changed four hourly if of large size and two hourly if small.

(*b*) *A Mustard Poultice* is an ordinary linseed one with the addition of mustard. The proportion of mustard is generally one to three parts of linseed for an adult and one to five parts for a child. The mustard can either be mixed with tepid water into a smooth paste and added to the linseed or it may be well mixed with dry linseed before any water is added. It should not be left on long enough to blister the skin and a piece of thin muslin may be placed over it before applying it if the skin is very tender.

(*c*) *A Charcoal Poultice* is made by adding charcoal to a linseed poultice. The powdered charcoal may be mixed with water and added to the poultice when made, and some dry charcoal may be sprinkled on the surface of the poultice before applying. It is made in the proportion of one part of charcoal to three parts of crushed linseed. A charcoal poultice may be ordered for the treatment of bad sloughing bedsores.

(*d*) *A Bread Poultice* is made by taking a piece of stale bread and boiling it in water for a few minutes. The water is then strained off through muslin and the hot pulp spread on a piece of linen and applied. A little olive oil may be smeared on the surface of the poultice to prevent it from adhering to the skin.

(*e*) *A Starch Poultice.*—The starch poultice is sometimes ordered for irritable affections of the skin, especially for sores and scabs on the head. One tablespoonful of starch is mixed with cold water and boiling water is then poured upon it till it becomes a thick paste. This paste is spread on linen and applied when it is cool. For scabs it requires to be renewed several times till they are loosened. The scabs are then picked off with forceps and the head dressed with ointment.

Fomentations are made by pouring boiling water on a piece of flannel or soft blanket or lint, which is then wrung out and applied to the skin. The fomentation is covered with a piece of jaconet and wool and fixed in position by a bandage. The material that is to be used for the fomentation is wrapped in a small towel or wringer and placed in a bowl. Boiling water is then poured on it, and it is wrung out in the towel till quite dry by twisting both ends of the wringer in opposite directions. The fomentation is then taken from the wringer, shaken out, tested by placing it on the back of the hand, and applied.

A Boracic Fomentation is made with lint which is impregnated with boracic acid, or a quantity of boracic crystals is placed in the porringer below the wringer before the boiling water is poured on.

Other Drugs are sometimes used for fomentations such as carbolic acid (1 in 80); perchloride of mercury (1 in 2000), or lysol in the proportion of half a teaspoonful to the pint. It is well to remember that carbolic fomentations should never be applied to the extremities as they are apt to produce gangrene of the fingers or toes.

Turpentine, opium and belladonna are also applied on fomentations.

A Turpentine Stupe is made by sprinkling 1 or 2 drachms of turpentine on the flannel or lint before the boiling water is poured over it, so that the turpentine may be evenly distributed, otherwise blistering may occur. The turpentine stupe is frequently ordered in the treatment of distension in typhoid fever. Opium and belladonna fomentations may be useful to relieve pain. Thirty minims of tincture of opium or belladonna are sprinkled over the flannel or lint after the fomentation has been wrung out. The quantity must be carefully measured in a minim measure.

Hot Bottles are also used as carriers of heat. Their use is described in Lecture II.

II.—The Application of Cold.

Certain conditions occur in nursing, when it is necessary that the patient's temperature be lowered as speedily as possible, otherwise death will ensue. In hyperpyrexia the chief method of reducing the temperature is by means of the cold bath. Cold water used externally in the treatment of fever removes the poison more quickly, reduces the fever and lessens the chance of delirium.

(*a*) *The Cold Bath.*—Fasten a towel round the patient's hips and remove the shirt. Cover him with a sheet or blanket and lift him on the under sheet into the bath. The temperature of the water should begin at 90° F. and be reduced to 65° F. by the addition of ice. Ten to fifteen minutes is generally long enough for the bath. The pulse gets feeble and the patient shivers a little at first. If this shivering gets violent and the patient becomes blue the bath must be stopped. Lift the patient out on to a warm blanket—dry him well with warm towels and put on a bedgown. Do not put too many blankets on the bed, a sheet and blanket are sufficient.

(*b*) *Tepid or Cold Sponging* is employed to reduce the temperature in fever and to induce sleep. It acts by the evaporation of water from the surface of the body lowering the body-heat. For tepid sponging water at a temperature of 85° F. should be used, and for cold sponging at 65° F. A mackintosh and blanket are placed below the patient, the bedgown removed, a blanket left to cover him. Two bath-towels or draw-sheets are rolled up and tucked in at each side of the body from the armpits to the ankles. A sponge or a piece of wool is wrung out of the water, but not too dry, and is then passed rapidly over the body in a downward direction. The face, neck and arms, then the chest and abdomen, and the legs are done, then the patient is turned on his side, while the back is sponged with long strokes. The sponge must be wrung out frequently, and the water kept at the proper temperature by adding cold water or ice. If there is no shivering the sponging can be continued for twenty minutes, the nurse being careful to keep the patient covered, except at the part which is being sponged. When the sponging is over, the patient is dried, a warm shirt is put on with a sheet or light blanket as a covering. A hot bottle is useful if the patient feels chilly and the temperature should be taken half an hour after sponging.

(*c*) *Ice Cradling.*—This method of reducing the temperature is not so disturbing to the patient, but it has the disadvantage of requiring a large quantity of ice and is not very efficacious.

Remove the patient's bedgown and cover him with a sheet. Place two long cradles over him and suspend six to eight icebags from the bars of the cradle. The icebags after being filled must be wrapped in lint to prevent any dripping of water. Cover the cradles with a blanket tucking it in securely at the sides. The patient may have a hot-water bottle at his feet if he complains of cold.

(*d*) *Cold Packs.*—The bed is prepared as for a hot pack. Take two large sheets, fold them lengthwise into four thicknesses, wring them out of cold water at 60° to 65° F. and place one under the patient, tucking it well into the axillæ, and the other over the patient, arranging it tightly round the neck and over the arms. The sheets may be kept cool by rubbing with ice or by constantly dropping water on them from a watering can, or by removing them every fifteen minutes and repeating the process. If three large towels are used instead of sheets, they can be more easily changed and wrung out again, one for the trunk and one for each extremity. The temperature should be taken every five minutes, and the nurse must watch the pulse carefully. The condition of the temperature and pulse are the indications of how long the pack should last.

(*e*) *Ice Bags.*—The usual method of applying cold continuously is by means of indiarubber ice-bags—the one in most common use being the ice-cap. To fill it, the ice must be broken into small pieces with an ice-pick or an ordinary hat-pin, the cap being only half-filled and the air expelled before the top is screwed on. The addition of a little common salt to the ice makes the cold more intense. A piece of lint or flannel made into a bag should always cover an ice-bag cap, as the intense cold is very irritating to the skin. In head cases it is advisable to tie the bag to the top of the bed, so that it just rests on the head, thus keeping the whole weight off the patient's head. The nurse must refill the bag before the ice has all melted; as a rule it requires filling every two hours.

(*f*) *Ice Poultices.*—To make an ice poultice, a double layer of gutta-percha tissue is cut so that it is a little larger than the surface to be covered. On the lower leaf is sprinkled a thin layer of linseed meal and upon that some crushed ice to the depth of half an inch. A little common salt is then sprinkled on the ice and a second layer of linseed meal added. The upper leaf of tissue is then turned over the lower one and the edges sealed with chloroform or turpentine. An ice poultice should be put in a flannel bag and a piece of lint placed between it and the skin before applying.

(*g*) *Iced Compresses.*—Two pieces of lint are required· They are placed in a bowl of iced water with a lump of ice in it and kept constantly cold by changing frequently, one piece being in the iced water while the other is on the painful part. To keep ice, wrap it in a piece of flannel or old blanket and suspend it over a small bath.

Evaporating lotions are used in the same way as a cooling lotion to reduce inflammation. A single fold of lint or flannel is wrung out of some evaporating lotion—Lotio

Plumbi or Goulard's lotion is the one in most common use—and placed on the inflamed part, being left uncovered and exposed to the air to hasten evaporation. The lotion may be mixed with a little methylated spirit, which helps to hasten the evaporation and so increases the cooling effect. The lint must be changed frequently and a mackintosh and draw-sheet should be placed below the part which is being treated.

(*h*) *Leiter's Tubes.*—These tubes are useful when a continuous supply of cold water is required on any part. They are most often used for the head in delirium and for the knee in cases of synovitis. They consist of a coil of flexible metal tubes which can be moulded to any part of the body and through which a current of cold or ice-cold water is kept running. A rubber tube is fixed to one end of the coil and is placed in a vessel containing the water at a height above the patient; while another piece of tubing at the lower end is placed in an empty bucket into which the water runs after having flowed through the coils.

BATHS.

The ordinary cleansing bath has already been described in Lecture II. Baths are classified according to the temperature at which they are used.

A *cold* bath may vary from 40° F. to 65° F.
A *tepid* ,, ,, 75° F. ,, 90° F.
A *warm* ,, ,, 90° F. ,, 100° F.
A *hot* ,, ,, 100° F. ,, 110° F.
A *vapour* ,, ,, 105° F. ,, 120° F.
A *hot-air* ,, ,, 115° F. ,, 150° F.

The nurse should always take the temperature by means of a bath thermometer, and if the bath is a very hot or a very cold one, the patient should not be put right away into a bath at that temperature, but into water at a moderate heat first, the temperature being increased or reduced by adding more hot or cold water.

MEDICATED BATHS.

1. *A Mustard Bath.*—This is used in convulsions, or for children with laryngeal trouble, also for young infants in a state of collapse. The usual quantity of mustard used is about 1 oz. to every 5 gallons of water. The temperature of the water should be 100° F. to 105° F. The mustard must never be sprinkled in a dry state on the water but must be mixed into a paste with a little water and added to the bath. In children's wards it is a good plan to have a supply of small muslin bags filled with this quantity of mustard. If a mustard bath is required in a hurry, the little bag is at hand and can be squeezed into the water.

2. *A Bran Bath.*—Three or four pounds of bran are boiled in a gallon of water, the mixture strained and the infusion added to a hot bath. Another method is to fill an ordinary bath, then to put 3 or 4 lb. of bran into a muslin bag and squeeze the bag in the water.

3. *A Sulphur Bath.*—Dissolve 4 oz. of sulphide of potassium in a quantity of hot water and add to the bath. An ordinary bath contains about 30 gallons of water.

4. *An Alkaline Bath* or soda bath may be ordered in cases of rheumatism. It is prepared by adding 6 to 8 oz. of carbonate of soda to a hot bath.

5. *A Calomel Bath* can be given by means of Allen's apparatus in the form of a vapour bath. The amount of calomel, generally about 15 grains, is placed in the small dish above the lamp. The heat converts the calomel into

vapour which is carried by the steam and deposited on the patient's skin. This bath may also be given with the patient sitting up in a chair under which the lamp is placed. The patient is enveloped in a blanket reaching from the neck down to the ground.

6. *Local Baths* are used mainly to relieve inflammation by warmth and antiseptics.

For the extremities a special trough-shaped bath is used. The bath holds about 8 or 9 pints of water, and one end is sloped and hollowed out so that the arm or leg may rest comfortably in it. The temperature of the water should be 100° to 105° F., and should always be tested by a thermometer. Any antiseptic may be added, carbolic (1 in 80), lysol (½ a drachm to the pint), or iodine is sometimes used for slow-healing ulcers, in the strength of 2 drachms of tincture of iodine to a gallon of water. The nurse must see that the limb is lying comfortably and is not pressing on the edge of the bath. A pad can be placed below to avoid this. The limb is immersed and covered over with a mackintosh and a small blanket so as to retain the heat. The water in the bath must be kept at the required temperature by adding hot water, but the nurse should be careful to take the limb out before pouring in more hot water.

For Diseases of the Pelvic Organs a sitz bath may be ordered. The bath is filled with water at 105° F. and the patient sits in it, only the thighs and lower part of the trunk being immersed. The patient must be covered with a blanket which is tucked in round the bath.

A foot bath is used for sprains, or as a remedy for a cold in the head with an ounce of mustard added to it.

The continuous bath may be ordered in cases of large suppurating wounds, in extensive burns and in skin diseases.

It is also used in cases of operation on the bladder, where supra-pubic drainage is resorted to, in order to keep the parts clean. A temperature of 98° F. to 100° F. is maintained by adding more hot water. It is advisable to have a bath with a tap to run off a little of the water before adding more hot. Failing a bath of this kind some of the water must be removed by means of a bowl. A water-cushion is placed at the bottom of the bath for the patient to rest on and an air-pillow can be put in to support the head. It is well to have a hammock arrangement of strips of canvas attached to the sides of the bath and on this the patient is suspended. The bath should be covered with a mackintosh sheet and a blanket. It is important to have a thermometer constantly in the bath, so that the water may be kept at the desired temperature. The bath may last for a few hours or even days. If the bath is of long duration, the patient must be lifted out and dried twice a day and at those times should use a bedpan. While this is being done the bath can be emptied, cleaned and refilled.

LECTURE VIII.

Counter-irritants—Preparation for Aspiration and Tapping—Nasal Feeding—Œsophageal Feeding—Washing Out Stomach.

COUNTER-IRRITANTS.

COUNTER-IRRITANTS are agents used to produce a condition of irritation or inflammation of the skin with the object of relieving some disease in a deep-seated part of the body. They may be so mild as only to cause a redness of the skin or may be strong enough to produce blistering.

The more common counter-irritants are—mustard in the form of plasters or leaves, iodine, croton oil, dry or wet cupping, blisters and leeches.

1. *Mustard Plasters.*—To make a mustard plaster the mustard is mixed with cold water to a fairly thick consistency. Mustard may be used alone or with the addition of flour in the proportion of three parts of flour to one of mustard. It is then spread on a piece of linen rag or on several layers of tissue paper. When it is applied, raise the plaster a little to see if the skin is red. If the patient complains of a smarting pain remove it. A piece of washed-out muslin or a piece of tissue-paper may be put over the plaster before applying. When the plaster is taken off cover the part with a layer of cotton-wool. A plaster should never be left on long enough to raise a blister unless it is to be used as a blistering agent. A little ointment or oil dressing may be applied after the plaster is removed.

2. *Mustard Leaves* are used more than plasters as they are always ready for application. Wash the part to which the leaf is to be applied, moisten it in tepid water and apply. If the skin is very tender or if the patient is a child, put a piece of soft muslin over the surface of the leaf before applying. The leaf should remain on for about fifteen minutes. After it is removed the part is covered with a piece of cotton-wool. If it is necessary to continue the irritation a fomentation may be applied to the part.

3. *Iodine.*—The part is first washed with soap and water and dried. Iodine is then painted on with a camel-hair brush, and the first coat allowed to dry before another is applied. If the patient is a child one coat of iodine is sufficient.

4. *Croton oil* is a very powerful irritant and is not often used. It produces a vesicular rash which later may become pustular. Two to four drops of oil are rubbed on the part with a small piece of flannel. It may be diluted with almond or olive oil to reduce its powerful action.

5. *Dry Cupping.*—For this purpose place on a resection tray four or five cupping glasses of different sizes, some strips of blotting paper, a small vessel containing methylated spirit, a box of matches and a pot of vaseline. If no cupping glasses are to be had wineglasses answer the purpose.

To Apply the Cupping Glasses.—Wash and thoroughly dry the part to be cupped—generally the loins. The edge of a cupping glass is smeared with vaseline, one of the strips of blotting-paper is dipped in spirit, placed in the glass, and set alight, the glass being applied immediately to the spot. The skin is now sucked up into the cup and a distinct swelling forms. As many cups as are ordered are applied in the same way. The cups are left in for a few minutes and then removed by inserting the finger-nail under the edge of the glass. A poultice may be applied for a time after the glasses are taken off, after which a piece of cotton-wool is placed on the part.

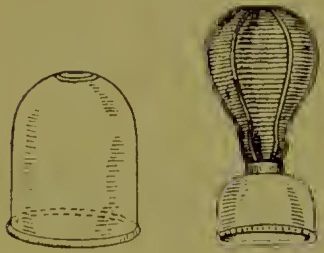

FIG. 12.—Cupping Glasses.

6. *Wet Cupping.*—Prepare the same things as for dry cupping with the addition of a scarificator, some tincture of iodine and a sterilized dressing.

The skin of the part is washed, dried and painted with iodine and a few incisions made by means of the scarifier. The glasses are then applied as for dry cupping. The blood is sucked out of the small cuts into the cups. When the amount of blood has been removed, the glasses are removed and the part is dressed with a sterilized dressing.

7. *Blisters.*—These may be applied either in the form of a plaster or by means of blistering fluid. Wash the part carefully with soap and water and swab over with some ether. If a plaster is used, cut it to the required size, warm it and apply. Do not secure it too tightly, but give room for the blister to rise, otherwise it is very painful for the patient.

In using liquor epispasticus (blistering fluid) be careful to make a ring of vaseline or olive oil round the surface to be treated. This is to prevent the blistering fluid from running down and blistering the surrounding skin. The fluid is then painted on with a camel-hair brush within the circle of vaseline. It is allowed to dry and two or three coats are applied in the same way. Cover the part with cotton-wool and bandage it in position but not too tightly.

A blister takes about six to twelve hours to rise. When it has risen, put a piece of sterile wool under the blister, then snip the most dependent part with a pair of sterilized scissors and allow the fluid to escape on to the wool. The wool is used to prevent the fluid from running over the surface of the skin below and producing another blister. An ointment dressing (zinc or boracic) is applied and should be changed twice in the twenty-four hours.

If the blister is to be kept open, the skin of the blister is entirely removed and an irritant dressing applied, the nurse being careful to cut the dressing the exact size of the blister.

8. *Leeches* (Latin, *Hirudines*).—Leeches are blood-suckers and are used for taking away a small quantity of blood. The usual quantity each one takes is 1 to 2 drachms. They must never be placed over a large blood-vessel.

To Apply Leeches.—Having washed the part well with soap and water, be careful to wash off the soap and dry with a little friction to draw the blood to the surface. Then place a leech in a test-tube which has been half-filled with cotton-wool, care being taken to see that the thinner end which is the head is at the mouth of the tube. Place the test tube over the part. If the leech will not bite, rub the part with a little milk or prick the part so as to draw a little blood. If no test-tube is used hold the leech in the fold of a towel lightly or hold it between the blades of a dissecting forceps and apply its head to the skin. The leech will drop off when it is full, but if it should be necessary to remove it before, do not drag it off, as it will leave its teeth in the wound. Put a little salt on its tail when it will fall off. A leech generally sucks for about three quarters of an hour. If several leeches have to be applied over a small surface, they can be placed in a wineglass and the glass turned over on to the spot. Leeches should never be used twice, but if they are scarce they may be placed after coming off in a plate of salt and water. They will then vomit up the blood they have sucked. They are placed in clean cold water then. If the leeches are not required again, carbolic lotion (1 in 20) kills them quickly and they may then be burnt. When the leeches have all fallen off, wash the bites and apply dry wool. To stop bleeding a little pressure is usually sufficient. If it persists a small piece of ice is applied to the bite or the part is painted with a little collodion. If these fail the doctor may order a styptic such as perchloride of iron or adrenalin. The nurse must watch carefully to see that the bleeding does not begin again.

If a leech is ordered to be applied behind the ear or close to the eye use a test tube to place it in the exact position.

If it has to be applied to an internal surface such as the mouth or vagina, it must have a thread passed through its tail by means of a needle, so that it can be tethered and not get lost. If by chance a leech does get swallowed give copious draughts of salt and water. This will act as an emetic and will also have the effect of making the leech relax its hold of the stomach wall if it has attached itself thereto.

If it is necessary to remove more blood than the leeches have sucked fomentations applied over the part will increase the flow.

9. *Venesection or blood-letting* is occasionally resorted to in the treatment of inflammation. The median basilic vein at the bend of the left elbow is generally chosen. The skin is carefully prepared as for an operation, and a piece of bandage is tied firmly round the arm above the elbow. The vein becomes distended and is then opened with a scal-

pel. A graduated bowl is used to receive the blood, and the quantity must be measured. The old hospitals still have what are called "bleeding-bowls". They are relics of the days when blood-letting was the treatment for most diseases. The quantity of blood removed is from a pint to a pint and a half. When this amount has been allowed to escape the bandage is taken off the upper arm; the small incision is closed with a stitch, dressed with a sterilized dressing and the part bandaged firmly. Some stimulant should be at hand in case the patient feels faint.

PREPARATION FOR ASPIRATION OF FLUID FROM THE CHEST.

It is sometimes necessary to remove fluid from the chest by aspirating (*Paracentesis thoracis*). The nurse should know what to get ready for this operation. The aspirator is used. This consists of a bottle into which the fluid is drawn, the air having been previously exhausted by means of an air-pump. The nurse must see that the aspirator is in good working order. The trocar, cannula and the blunt-pointed probe which fits the cannula must be sterilized. The size of trocar will probably be chosen by the doctor. On the dressing-wagon place a tube of ethyl-chloride for the local anæsthetic, some tincture of iodine and swabs for the preparatory treatment, a few sterilized towels to place round the part, some sterilized gauze or wool cut in small pieces, and collodion for the after-dressing. The trocar and cannula are placed in sterile water, the aspirator is fitted together and the air in the bottle exhausted by pumping it out with the syringe. An empty bowl should be at hand in case there is much fluid, as the bottle may have to be emptied during the operation. The fluid should be measured afterwards and the amount noted.

After use the whole apparatus requires careful cleaning; the cannula should have carbolic lotion drawn through it and should afterwards be boiled along with the trocar. After the boiling, rinse them in methylated spirit and dry before putting them back in the case.

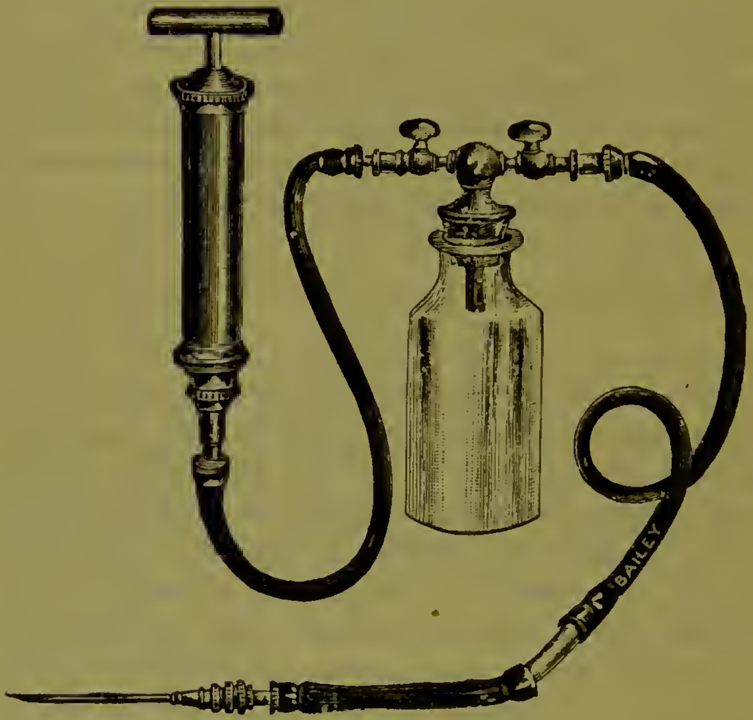

FIG. 13.—The Aspirator.

PREPARATION FOR TAPPING OF THE ABDOMEN.

Tapping of the Abdomen (*Paracentesis abdominis*) is resorted to when there is fluid in the peritoneal cavity as in ascites. When there is great œdema of the legs in dropsy, they also are drained.

As in aspirating the chest have everything that will be required at hand on a dressing-wagon or table. Ethyl-chloride, tincture of iodine, sterile towels, sterile swabs, gauze and wool and collodion. The abdomen is tapped with the aspirator exactly as in the case of the chest, or Southey's tubes may be used. These consist of small trocars and cannulæ; the cannula has a silver shield to attach at the top and an open end to which about four or five feet of fine rubber tubing is attached. These are all sterilized, also a piece of linen thread with which to secure the tubing to the cannula.

It is important for the nurse to see that the bladder is empty before the operation is begun. A roller towel or binder should be placed round the abdomen and tightened as the fluid escapes. A pail or large glass jar is placed below the bed to receive the fluid.

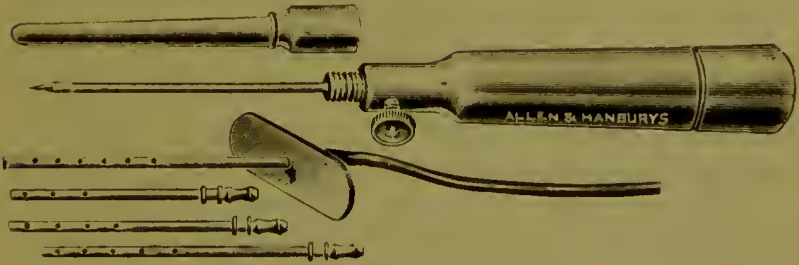

FIG. 14.—Southey's tubes.

When the drainage is completed, a collodion dressing is put on. The fluid should be measured and the quantity reported.

For tapping of the legs, Southey's tubes are used in the same way, or the legs are pricked in several places with an ordinary needle which has been sterilized. Absorbent sterile dressings will be required in the latter case to soak up the fluid as it comes from the punctures.

It is advisable in cases of tapping to have at hand a hypodermic syringe charged with strychnine in case it is required.

NASAL FEEDING.

Nasal feeding requires to be done with surgical cleanliness and great gentleness, no force being used. The patient is usually a child; to control its movements, put the arms down at the sides and wrap the child up bodily (leaving the head free) in a sheet or blanket. The patient is placed in the recumbent position with the head in the middle line and it is advisable in all cases for the nurse to have an assistant.

What to Prepare.—A nasal feeding apparatus, which is similar to the rectal feeding apparatus but with a much smaller rubber catheter (No. 5 or 6) is used. It should be sterilized and placed in a bowl of sterile water. A small gallipot containing a lubricant for the catheter, such as glycerine, olive oil or butter, a few wool swabs, a sterilized or a clean towel, the measure containing the feed (usually 4 to 6 oz. of milk at 98° F.) in a pannikin of hot water to keep it warm, and any medicine or stimulant measured out should be at hand.

How to Give.—The nostrils are swabbed out with a little weak solution. The child is then wrapped in the sheet and the towel placed below its chin. The nurse having scrubbed her hands, takes the feeding apparatus, places it on the towel, oils the catheter and, standing on the right of the patient, holds the head with her left hand while she passes the catheter up the nostril and backwards along the floor of the nose into the pharynx and œsophagus. It should be passed for about ten inches, the nurse seeing that it is not curled up in the mouth. If there is any distress in breathing or if a cough is started, withdraw the catheter and pass it again, as it is probably in the larynx. When it is safely passed, pour a little sterile water (about a drachm) down the tube as a safeguard. If there is no coughing you may be sure that the tube is in the stomach. The food ordered may then be given and any powder, medicine, or stimulant should be added. When all the fluid has passed, pinch the catheter near the nostril, and draw it carefully out. This is to prevent any drops getting into the trachea. The nostril is then swabbed with a piece of wool. The nostrils are used alternately for feeding as they are apt to become sore if this method is continued for some time. This method of feeding is repeated four hourly as a rule.

Œsophageal Feeding.

The method is practically the same as that employed for nasal feeding. A funnel with tubing to which is attached an œsophageal tube is passed through the mouth into the œsophagus. Some lubricant is used for the tube.

To Wash out the Stomach.

A long rubber stomach tube is used to which is affixed a glass funnel. These should be sterilized by boiling and placed in a basin of sterile water or boracic lotion. Some glycerine or oil for lubricating the tube, and about a gallon of sterile water or boracic lotion at a temperature of 100° F. will also be required. A large basin or bucket should be at hand to receive the returned fluid.

The patient is allowed to sit up in bed or in a chair, with a mackintosh sheet wrapped round him below the chin and a bath towel arranged over it. The head is inclined slightly backwards, and the tube is passed into the pharynx and the patient told to swallow it. When the tube has entered the stomach the funnel is slightly elevated and about half a pint of the lotion is poured gently into it. Before it has all run out the funnel is lowered and the fluid with the contents of the stomach are siphoned off into the bucket. This process is repeated until the lotion comes back quite clear. In some cases after the stomach has been washed out, food is given by the same tube before it is removed.

LECTURE IX.

FRACTURES.

Causes of Fractures—Varieties of Fracture—Signs of Fracture—Union of Bone—Treatment of Fractures—Special Fractures—Splints—Padding of Splints—Extension—Sprains—Dislocations.

A FRACTURE is a sudden or forcible solution of the continuity of a bone, i.e. a broken bone.

CAUSES OF FRACTURE.

Fractures are caused in three ways.

1. *By direct violence*, when the bone is broken directly at the spot where the force was applied, as in fracture of the tibia by being run over.

2. *By indirect violence*, where the bone is fractured by a force applied at a distance from the seat of fracture and transmitted along the limb; as in a clavicle fractured from falling on the outstretched hand.

3. *By muscular contraction*, when the bone is broken by a sudden violent contraction of the muscles. The patella is the bone most frequently fractured in this way.

VARIETIES OF FRACTURE.

1. *Simple.*—The bone is broken but there is no external wound.

2. *Compound.*—The bone is broken and there is an external wound leading down to the site of fracture.

3. *Complicated.*—The bone is broken and has injured some internal organ, e.g. a broken rib piercing a lung.

4. *Comminuted.*—The bone is broken or splintered into pieces.

5. *Impacted.*—The bone is broken and one end is wedged into the interior of the other.

6. *Greenstick* —The bone is partially bent and partially broken, as when a piece of green wood is broken. It occurs in children, especially in those with rickets.

7. *Depressed*—When a piece of the skull is broken and driven inwards.

8. *Separation of an Epiphysis* takes place between the shaft of a bone and its growing end and occurs only in young patients.

SIGNS OF FRACTURE.

(*a*) Pain and discoloration.

(*b*) Swelling.

(*c*) Deformity.

(*d*) Unnatural mobility (i.e. the bone can be moved where it should be fixed).

(*e*) Loss of power and shortening.

(*f*) Crepitus or grating which is heard when the ends o the bone rub together. The nurse should never try to obtain this sign.

To find out the kind of fracture and its exact position the X-rays are used. By this means a skiagraph of the bone is taken, showing the fracture and its extent.

UNION OF BONE.

Immediately after a fracture, the two broken ends of bone are imbedded in a blood clot owing to the tearing of the periosteum. The injury sets up inflammation in the tissues round about and granulation or fibrous tissue is formed. This tissue fills up the space between the two ends of bone and is found outside and also under the lining membrane. Lime salts are deposited in this tissue, so that the ends of bone are joined together by a soft spongy-like mass of bone called *Callus*. This callus hardens and forms the union, any excess of it being absorbed. The time required for this repair of bone varies in the different bones; small bones like the metatarsals or phalanges take two weeks, the ribs three weeks, the humerus six weeks and the femur eight to ten weeks.

TREATMENT OF FRACTURES.

In simple fractures the limb or part must be kept immovable by means of splints, either temporary, such as folded newspapers or umbrellas, or proper wooden splints if they are at hand.

If it is an upper extremity it should be supported in a sling and the patient may then walk. If a lower limb is injured the patient should remain lying and no attempt to walk should be made.

The treatment consists in :—

1. Reducing the fracture, i.e. placing the fragments in proper position.

2. Keeping the bone in position by means of splints till union has taken place.

3. Restoring the limb's former functions by means of passive movements and massage.

In compound fractures, before treating the fracture, any bleeding must be arrested, the wound is then washed and cleaned with some antiseptic lotion and when quite clean a sterilized dressing is put on and secured by a bandage. Splints are then applied as in the case of simple fractures.

SPECIAL FRACTURES.

The ordinary simple fractures of the wrist, arm or clavicle are seldom admitted into the hospital wards, these cases being treated in the out-patient department and sent home.

Fracture of the Femur is perhaps the one most likely to be seen in the hospital wards. The thigh is generally broken at the neck or at some point in its shaft. Extension to overcome shortening, and fixing the limb by splints is the usual method of treatment. Extension may be applied by weights or a long Liston splint is applied, reaching from the armpit to below the foot on the outer side, and a second splint applied on the inner side, reaching from the groin to the knee. The splints are secured by bandages, one round the ankle, one at the lower and another at the upper part of the thigh, and by a broad bandage or binder round the chest. The injured limb may be secured to the sound one by extra bandages. In many cases of fracture, especially in old or enfeebled patients, shock is present and requires to be treated. The patient must be wrapped in warm blankets, have hot-water bottles round him, and stimulants may have to be given under the doctor's directions.

Pott's Fracture.—This is a fracture of the lower end of the fibula with dislocation of the foot outwards and backwards. The limb is supported by a special splint and bandaged.

Colles's Fracture is a fracture and dislocation of the lower end of the radius, generally caused by falling on the outstretched hand. The splint generally used is Carr's and the hand and forearm are massaged to prevent stiffness and adhesion of tendons.

Fractured Ribs.—In this kind of fracture there is generally pain on breathing deeply or on coughing. The patient is placed in an upright position by means of a bed-rest and a broad body bandage is applied round the chest for support, or the part may be strapped. Great care must be taken to avoid pressing on the broken rib or ribs as the ends may penetrate the lung. The arm on the injured side should be supported in a sling. If the patient coughs up blood after the accident no bandage should be applied as it points to the lung being injured. In such a case put the patient lying towards the injured side, but not on it, and give him plenty of air. The strapping is applied in strips of about 1½ to 2 inches wide; the strips are put on from below upwards, each band overlapping the preceding one, and they should extend at back and front beyond the middle line.

Fractured Patella.—Fracture of the patella is generally treated by operation, the broken fragments being wired together with silver wire and afterwards the knee is treated by massage.

Fractured Spine.—In cases of fractured spine, all the muscles may be paralysed below the seat of injury, so that the patient feels no pain.

The bed for a case of this kind should have a fracture board over the wire mattress and a water-bed or air-bed for the patient to lie on. It is advisable to have a short bed-gown which is open down the back. Due precautions must be taken to prevent bedsores as they are liable to occur in such cases. The patient may suffer from shock and will require treatment for that condition.

Fractured Pelvis.—The pelvis may be broken at one side or at both and there is danger of the bladder or intestine being injured. A broad flannel bandage is applied firmly round the pelvis and the patient requires careful moving. The knees should be tied together and a pillow placed below them.

Fractured Skull.—The skull may be fractured on the vault or at the base. In both cases the head should be kept high by pillows. In fracture of the vault there is generally a scalp wound and the bone is depressed. In fracture of the base, the chief symptoms are bleeding from the nose and ears and unconsciousness. The head is shaved and cold applied. A purge is given at once and the patient is kept on low diet. If there is escape of cerebro-spinal fluid from the ears they should be syringed and lightly packed with antiseptic gauze.

SPLINTS.

These are the apparatus used in treating fractures and are of two kinds, movable and immovable. Movable splints are made of metal, wood, gutta-percha, etc.; immovable splints are made of plaster of Paris, starch and gum and chalk.

The *Splints* in most common use are :—

1. *Liston's Long Splint*, used in cases of fracture of the femur. It is a long wooden splint which extends from the armpit to below the foot.

FIG. 15.—Liston's Splint.

2. *MacIntyre's Splint* for fracture of femur or tibia. The

splint is made of metal and is in two parts which are

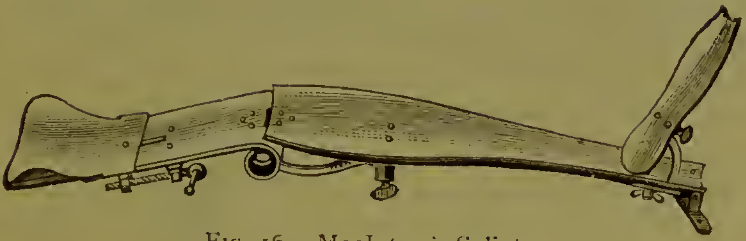

FIG. 16.—MacIntyre's Splint.

adjusted to any angle by means of a screw. It has a wooden footpiece.

3. *Cline's Splints* are used in fracture of the tibia and

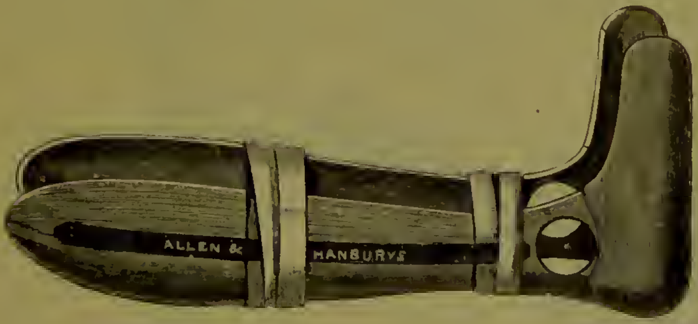

FIG. 17.—Cline's Splints.

fibula and consist of two parts for the leg, one for the inner and the other for the outer side, the outer one having a foot piece.

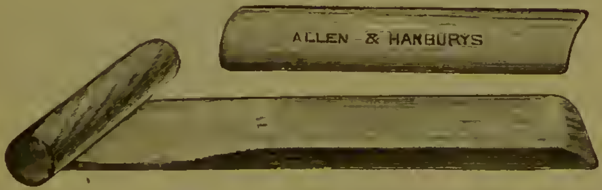

FIG. 18.—Carr's Splint.

4. *Carr's Splint* for Colles's fracture of the lower end of

the radius is made of wood and is pistol-shaped. The longer splint with the hand piece is applied in front and the shorter splint on the back of the wrist and forearm.

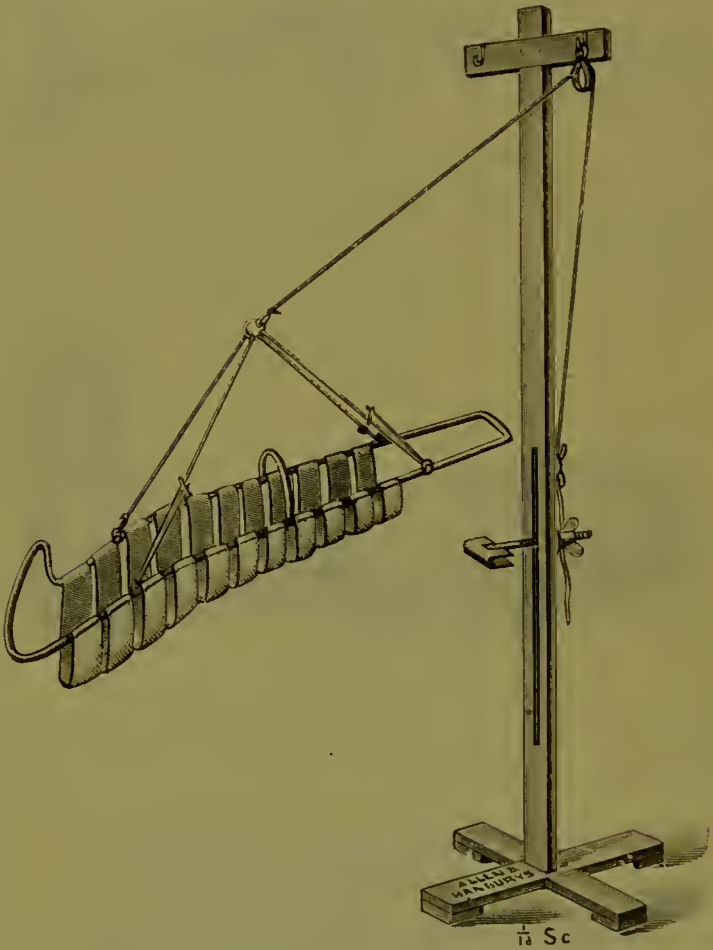

Fig. 19.—Hodgen's Splint.

5. *Hodgen's Splint* for fracture of the femur consists of an iron frame in which the limb is supported by strips of

webbing or house flannel and is fixed to an extension apparatus by means of pulleys.

6. *Gallow's Splint.*—This splint is used in treating fracture of the thigh in young children. The extension is applied vertically, the child being hung up by the feet with both legs at right angles to the trunk with the buttocks just lifted off the bed. In this way the child is easily kept clean and dry.

7. *Gooch's Splinting* consists of a number of flat strips of wood glued on to leather or American cloth, with divisions over the strips so that the whole is flexible in one way and quite rigid in the other. It is used for many kinds of fracture, the splinting being cut to fit the part.

PADDING OF SPLINTS.

All metal and wooden splints must be padded before being applied, and it is important that this padding should be well done, so as to be comfortable for the patient and to ensure that no part of the limb is pressed upon and a "splint-sore" produced.

The method of padding is best shown by practical demonstration.

A pad to cover the splint is made first by taking a piece of old linen or sheeting large enough to overlap the splint all round by two or three inches. Well teased tow is arranged so as to make a firm but elastic pad and the edges of the linen are then tacked along the back. When the pad is made it is fixed to the splint by means of a lace-stitch passing across the back, the pad being well drawn over the edges. The top and bottom ends are folded down over the ends of the splint and neatly overcast at the sides. The splint is then ready for use. If there is any chance of the splint getting soiled with discharge or with urine a piece of jaconet should be sewn over the linen cover at the part. In some cases it is better for the whole splint to be covered with jaconet for the sake of cleanliness.

For a jointed splint separate pads must be made for each part, the hinges being left free. The pads, in such a case, can be made of layers of house-flannel covered with old linen stabbed to form small mattress pads, which are then attached to the splint in the same way as the tow ones.

Cotton-wool should not be used for padding because it does not give at all and is apt to become lumpy.

To clean wooden splints rub with turpentine till all the marks of strapping are removed, then scrub with soap and water. The padding should be burnt. Metal splints are cleaned in the same way.

Gutta-percha is moulded to the part by first soaking it in hot water, while poroplaster is heated in the oven for a little to soften it. These two materials are frequently used as splints in fracture of the lower jaw.

Immovable splints are made of plaster of Paris, starch or gum and chalk. Plaster of Paris is the one in most ordinary use, and the nurse generally prepares the plaster bandages. They are made of soft crinoline muslin cut into long strips of the required length and width. Into the meshes of the muslin dry plaster of Paris is well rubbed with the palm of the hand, the bandage being loosely rolled up as each part is done. If they are not for immediate use, the bandages should be stored in an air-tight tin lying on their sides, so that the plaster does not fall out. By heating the plaster for a little in the oven before rubbing in the process is made much easier.

When the bandages are to be applied, they are placed in a basin of hot water and the water allowed to soak through them. A bowl of plaster mixed with water should be at hand, as extra plaster may be required. The parts to be put in plaster are covered with boracic lint or stockinette before the plaster bandages are applied. Hot bottles are placed round the limb after it has been incased in plaster to hasten the process of drying.

If there is any sore on the limb, a window must be left in the plaster over the wound so that it can be dressed.

The nurse may have to remove the plaster bandage. Special shears or scissors are used for cutting the plaster, and it facilitates the cutting if a little weak hydrochloric acid or peroxide of hydrogen is painted on along one side of the plaster. This softens it and it can then be cut with a pair of scissors.

When a splint has been applied the nurse must be on the watch for certain signs. There may be pain from pressure of the splint or bandages and if unrelieved by extra padding or loosening of the bandage, a nasty sore may form Another danger is from the bandage or plaster being too tight, so that the circulation in the limb is obstructed and gangrene of the part may follow. The colour of the toes or fingers and coldness will be the first sign. The patient may complain of a tingling sensation. The nurse must keep a careful watch on the extremities and feel them frequently. If she is in any doubt a doctor should be summoned. Nerves may also be pressed on with resulting paralysis of muscles.

EXTENSION.

This method is used in cases of fracture, especially in fracture of the femur. It consists of two strips of strapping attached to a piece of wood or stirrup. The piece of wood has a hole bored through the centre for a cord to pass. The strapping is cut about 2½ inches wide for an adult and 1½ inches for a child. These bands of strapping are applied to each side of the limb to reach up almost to the seat of fracture and so long that the wooden stirrup is about 3 inches beyond the sole of the foot. The bands are kept fixed by spiral bands of strapping applied from below upwards. The bony prominences at the ankle are protected by pieces of wool. The cord is then passed through the hole in the wood and over a pulley attached to the end of the bed. A weight is attached to the other end of the cord. The amount of weight will be determined by the surgeon. The weights attached to an ordinary scale do very well, but shot enclosed in bags or tins is in more common use. The end of the bed must be raised on blocks. The nurse's duty is to see that the weight is pulling in the right direction, that it is constantly in action, and that it is not resting on anything and that the patient's foot or splint is not pressing on the end of the bed. She must not remove the weight for any purpose, unless given permission to do so by the surgeon.

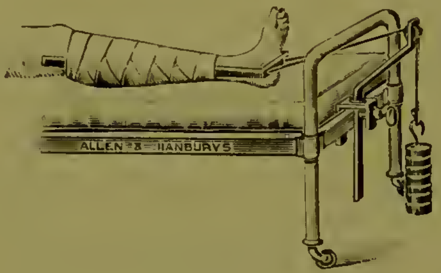

FIG. 20.—Extension Apparatus.

SPRAINS.

Sprain is the term applied to injuries to the muscles and ligaments at a joint. A few fibres of a muscle may be torn by some unexpected movement or the tendons and ligaments at the joint may be wrenched and torn. The joint most frequently sprained is the ankle. The signs are pain, swelling and discoloration of the part by effusion of blood from the torn structures. The treatment consists in covering the part with wool and binding firmly with a bandage in the figure of eight method. If the swelling is marked, evaporating lotion may be applied and changed frequently. Fomentations often give relief. When the swelling has begun to subside massage with passive movements is carried out if the pain is not too great.

DISLOCATIONS.

A dislocation is a displacement of the bones at a joint. The most common situations are the fingers, shoulder, elbow, ankle, hip, and jaw. The signs resemble those of fracture, viz., pain, swelling, deformity and inability to use the part. The difference is that in dislocations there is fixation where there should be movement. In dislocation of the shoulder, the head of the humerus escapes from the hollow in which it lies (the glenoid cavity) and the usual movements of the joint are impossible.

Treatment.—The dislocation is reduced by a doctor. Till the arrival of a medical man, the limb should be placed in a comfortable position. Hot or cold applications may be used. After the dislocation is reduced the limb is kept at rest for some days, and massage and passive movements are then carried out.

In *Congenital Dislocation of the Hip*, the child is born with a dislocated and malformed joint. The treatment consists in bringing down the head of the bone, forcing the thigh into a position of extreme abduction, the limb being then fixed by means of a plaster bandage for three months, after which the limb is brought by stages into the proper position, plaster being applied at each treatment.

LECTURE X.

HÆMORRHAGE.

Varieties of Bleeding—Symptoms of Hæmorrhage—Arrest of Hæmorrhage—Points of Compression—Tourniquets—Hæmorrhage after Operation or Injury—Concealed Hæmorrhage—Special Forms of Hæmorrage.

Hæmorrhage or bleeding is a dangerous condition which generally occurs as an emergency and requires presence of mind and prompt action on the part of a nurse.

VARIETIES OF BLEEDING.

1. *Arterial*; 2. *Venous*; 3. *Capillary*.

1. *Arterial Bleeding* is bright red in colour, spurts out in jets corresponding with each beat of the heart, and is in proportion to the size of the artery. The blood comes from the end of the vessel nearer the heart, and bleeding is as a rule painful.

2. *Venous Bleeding* is of a purplish colour, and comes in a continuous flow. The patient may not be aware that he is bleeding. It comes from the end of the vessel farther from the heart. The blood from a cut vein may spurt out if the vein lies directly over an artery, the pulsation being conveyed.

3. *Capillary Bleeding* is reddish in colour, and oozes out in a steady flow. It may be dangerous if spread over a large surface as in a lacerated wound or in cancer of the

breast. In persons with hæmophilia (bleeders) capillary bleeding may be very serious.

SYMPTOMS OF HÆMORRHAGE.

There are certain signs and symptoms which indicate that a person is losing blood. The chief are :—

1. Pallor of the face and lips.
2. Thirst.
3. A small rapid pulse and a falling temperature.
4. A feeling of suffocation and sighing respiration.
5. Great restlessness.
6. The vision becomes blurred.
7. The pupils of the eye dilate.

ARREST OF HÆMORRHAGE.

Nature's method of arresting hæmorrhage is by the retraction and contraction of the walls of the blood-vessels, and by the formation of a clot, when the blood becomes semi-solid at the mouth of the cut vessel and for a little way up.

Hæmorrhage is also arrested by the blood supply to the brain being diminished, producing faintness in the patient and so lessening the strength of the heart-beat. The beat of the heart being less, the flow of blood is less, so that coagulation takes place more readily and the clot is less likely to be dislodged by the blood stream.

Immediate Treatment.

Arterial Hæmorrhage.—Elevate the part and apply pressure over the wound with a pad, or with the thumb press the artery against the bone at the nearest point to the heart. Reassure the patient, who is generally frightened. Do not give stimulants.

Venous Hæmorrhage.—Elevate the part and compress the vein against the bone by means of a pad placed over the bleeding point and bandage. Elevation and a pad are generally sufficient to stop venous bleeding.

Bleeding from Varicose Veins is one of the commonest forms of venous hæmorrhage. In this condition the veins have become so thin that they are very liable to burst or the bleeding may be due to ulceration. The patient may not know that he is losing blood till a considerable quantity has escaped, so that immediate action is necessary. Elevate the leg and place a pad on the wound and bandage. If bleeding does not stop apply pressure above and below the wound.

Capillary Bleeding.—The bleeding is arrested by pressure over the part or by the application of *styptics.*

Styptics.—Styptics are astringent applications for arresting bleeding by causing the blood-vessels to contract and so to help in the formation of a clot. The styptics in common use are:—

Hot water at a temperature of 115° F.
Cold water. Ice.
Perchloride of iron (steel drops).
Turpentine. Alum. Tannic acid.
Adrenalin (an extract made from the supra-renal capsule).

POINTS OF COMPRESSION OF THE ARTERIES.

It is important for every nurse to learn the points at which the different arteries can be compressed, as hæmorrhage can be controlled by digital pressure while preparation is being made for securing the artery.

Points of Compression of Different Arteries.

Temporal.—Over the temporal bone, a finger's breadth in front of the opening of the ear.

Facial.—Against the jaw, 1 inch in front of the angle of the jaw.

Carotid.—Against the transverse processes of the vertebræ on side of neck, 1 in. from the middle line.

Subclavian.—Against the first rib, behind the middle of the collar-bone.

Axillary.—Against the head of humerus in the axilla.

Brachial.—Against the humerus in the middle of the upper arm, on a line with the seam of the coat-sleeve.

Radial.—At the wrist against the radius.

Ulnar.—At the wrist against the ulna.

Femoral.—In the middle of the groin against the pelvic bone just below Poupart's ligament.

Posterior Tibial.—At the inner side of ankle behind the prominence at the lower end of tibia.

Anterior Tibial.—Against the tarsus at middle of front of the ankle.

TOURNIQUETS.

If digital pressure cannot be kept up a tourniquet is used. (A tourniquet should be shown to the class and its use demonstrated.)

The tourniquets in common use are :—

1. *The Elastic Tourniquet* is a piece of thick elastic tubing with a hook attached to it for fixing. Another modification has an elastic tube to which is fixed a piece of box-wood with a hole through it and a groove. The piece of wood is placed on the line of the artery, the tubing put round the limb and fastened by pressing it into the groove in the wood. A strip of lint should be placed between the skin and the tourniquet. Martin's indiarubber bandage may be used as a tourniquet.

2. *Petit's Tourniquet* consists of a pad and a band of webbing fastened by a buckle. The pad is placed so as to press on the bone and is fixed by taking the webbing round the limb and fastening with the buckle. The pad can be screwed down to apply pressure on the artery by means of a thumbscrew.

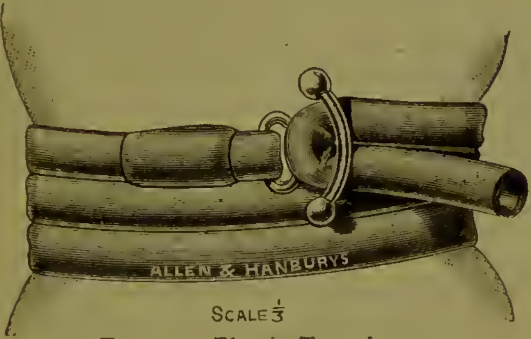

FIG. 21.—Elastic Tourniquet.

3. An *Improvised Tourniquet* can be made by folding a handkerchief and placing a piece of cork or a pebble in the fold to act as a pad. The pad is placed over the artery and the handkerchief knotted loosely round the limb. A stick is then passed between the limb and the knot and twisted till there is enough pressure to stop the bleeding.

Hæmorrhage which occurs in connection with wounds is called traumatic. There are three classes.

1. *Primary or Immediate.*—The bleeding which takes place at the time of the operation or injury.

2. *Reactionary* hæmorrhage occurs within twenty hours after an operation, when the patient begins to recover from the faintness caused by the anæsthetic. It is due to slipping of ligatures from the ends of wounded vessels or by dislodgement of a blood-clot.

3. *Secondary Hæmorrhage* may occur at any time from the second day up to two weeks after an operation. It is sometimes due to slipping of a ligature, to suppuration or to softening of the tissues above where the artery was tied. It is most commonly met with after amputations where the stump has suppurated and there is sloughing of the flaps. All cases of amputation should be carefully watched and the stump left exposed so that any bleeding can be detected at once.

INTERNAL OR CONCEALED HÆMORRHAGE.

So far we have dealt with external hæmorrhage, but bleeding can take place in one of the cavities of the body, as into the pleural or peritoneal cavities, the stomach, intestines, bladder or rectum. This is called *internal* or *concealed hæmorrhage*. Internal hæmorrhage is recognized by the same signs as external hæmorrhage—faintness, pallor of the skin and mucous membrane, quick soft pulse gaining in rapidity with a subnormal temperature, anxious expression, quickened sighing respiration, cold clammy sweat and dilated pupils. If these symptoms are met with after an operation, the nurse should suspect hæmorrhage and summon a doctor.

The Treatment.—Till the arrival of the doctor the nurse may carry out the following treatment:—

1. The patient to be kept in a recumbent position with the foot of the bed raised on blocks or on a chair.
2. The extremities to be bandaged from the feet up to the trunk.
3. A tight flannel binder applied to the abdomen.
4. To prepare saline solution and the apparatus for administering it either by rectum or subcutaneously.
5. Do not give stimulants.

SPECIAL FORMS OF HÆMORRHAGE.

1. *Epistaxis*, bleeding from the nose, is caused by a direct blow, by congestion, or as a result of disease.

Treatment.—To apply ice to the bridge of the nose or to the back of the neck to contract the blood-vessels. If the bleeding is excessive, make the patient lie down with the head to one side. Prepare for plugging the nostrils. Some strips of sterile gauze, a Bellocq's sound, a soft rubber catheter (No. 8), and a piece of stout silk will be required by the doctor.

2. *Hæmoptysis*, bleeding from the lungs, is a common complication of phthisis. The blood is bright red in colour and has a frothy appearance from being mixed with air-bubbles. The bleeding is generally preceded by a fit of coughing.

Treatment.—Call a doctor at once. Keep the patient quiet; lower the head and give ice to suck. An ice-bag, not too heavy, may be placed on the chest over the affected lung if the nurse knows which one is bleeding. Open the windows and let in as much air as possible. If the patient is faint remove the pillow from his head and turn the head on one side so that the blood will not be swallowed. Raise the end of the bed on blocks.

3. *Hæmatemesis*, vomiting of blood from the stomach, may be a complication of a gastric ulcer. In this case the blood is dark red in colour, often like coffee-grounds, and is mixed with traces of food.

Treatment.—Make the patient lie down and keep him quiet. Give nothing by mouth. Open the window and give plenty of fresh air. An ice-bag or a cold compress may be applied over the stomach. A doctor should be called.

4. *Hæmaturia*, blood in the urine, may have its origin in the bladder, kidneys or ureters. If from the kidneys it is mixed with the urine, giving it a uniform reddish colour. From the bladder the blood is bright in colour and comes at the end of micturition in small clots. These conditions should be noted and reported to the doctor.

5. *Bleeding from the Intestines*, is due to various causes, from ulceration of the bowel as in typhoid fever, or dysentery, in cancer of the intestine and from internal hæmorrhoids.

Treatment.—Keep the patient quiet. The end of the bed should be raised and cold in some form is generally ordered, such as cold-water injections or ice.

6. *Vaginal Hæmorrhage.*—In this form of hæmorrhage raise the pelvis of the patient on a firm pillow. A douche at a temperature of 115° to 120° F. may be given to arrest the bleeding and the vagina will be plugged with gauze or tampons.

7. *Uterine Hæmorrhage*, occurs during pregnancy or after child-birth (post-partum hæmorrhage) or as a sequela of operation.

Treatment.—Keep the patient as quiet as possible and do not allow her to get excited. Raise the end of the bed and open the windows wide so that there is plenty of air.

In post-partum hæmorrhage check the hæmorrhage till the arrival of the doctor by grasping the uterus and compressing it with a gentle kneading movement of the hand to cause it to contract. Have in readiness a hot douche 120° F.) and a sterilized uterine douche nozzle. Saline solution for infusion or transfusion should also be at hand.

Bleeding from the ears, occurs as a symptom of fracture of the bones at the base of the skull.

BANDAGING.

It is impossible to teach bandaging in one lecture, and very often this important subject is neglected in lecturing to nurses during their training. In those schools which have a preparatory school for probationers, this branch is taught before they enter the hospital and so the difficulty is overcome. Two methods are resorted to by those schools not so fortunately placed. The first is to show by demonstration at the end of each lecture one or two of the bandages and allow the class to practise them if time will permit. The second method is to have three or four meetings in the year for bandaging alone and devote the whole hour to it. Whichever method is resorted to, I would recommend as a guide a little book, "Bandaging Made Easy," published by the Scientific Press at one shilling. It is written by Sister Hosking of the London Hospital, is profusely illustrated, and should be a great help to any Sister who has to teach this important part of nursing.

LECTURES TO SECOND YEAR PROBATIONERS.

LECTURE I.

Administration of Medicines—Hypodermic Injections—Reading of Signs—Administration of Continuous Saline Infusion—Giving of Stimulants.

Drugs and Their Administration.

Drugs and their doses are found in the "British Pharmacopœia". Those in ordinary use are given there and are called *official;* some new drugs which are not contained therein are termed *non-official.* A nurse has to learn in the early days of her training how to give medicines, and she must take great care that no mistake is made. She also gains some knowledge of the action of certain drugs. Drugs are introduced into the system in five ways:—

1. *By the mouth,*	i.e., swallowed.
2. *By the lungs,*	,, inhaled.
3. *By hypodermic injection,*	,, injected under the skin.
4. *By inunction,*	,, rubbed into the skin.
5. *By the rectum,*	,, injected into the bowel.

Most medicines are given by the mouth. In an emergency or where a rapid action is required, a hypodermic injection is preferred.

Certain rules have to be observed in giving medicines, and it is well for the nurse to keep them always in her mind. They are :—

1. To shake the bottle, whether there is a precipitate or not.

2. To read the direction on the label carefully.

3. To turn the bottle with the label upwards, while pouring out the fluid, so that the label does not get disfigured.

4. To measure the dose accurately with a measure glass or spoon.

5. To give punctually at the time ordered.

6. Always to keep the medicines to be given by mouth separate from lotions or liniments.

7. To keep all poisons in a locked cupboard.

1. *Medicines Given by the Mouth.*

These are in the form of solutions, pills, oils, powders, cachets, tabloids or capsules. Disagreeable drugs are sometimes made up in the form of cachets or capsules. A nauseating dose is rendered less disagreeable by allowing the patient to suck a piece of ice just before swallowing it. Holding the nose firmly while the drug is being taken is another method. A drink of water or a sweet may be given afterwards.

To Give Castor Oil.—This is a medicine which a nurse has frequently to give and one which is disliked by most patients. It can, however, be given so that the disagreeable taste is disguised. A medicine glass is heated by passing it through hot water, a little lemon juice or brandy is then poured in and on the top of that the prescribed amount of oil. A little more of the juice or brandy is poured on the top of the oil and the edge of the glass smeared with lemon. This "sandwich" is swallowed quite easily. A crust of bread or a piece of lemon to suck may be given afterwards to remove any oily flavour.

For children, the oil can be mixed with an equal quantity of boiling milk and well shaken. If flavoured with a bit of cinnamon stick or a little oil of cinnamon, it is taken by a child readily.

Croton oil is a strong purgative which is sometimes ordered to be given to unconscious patients. To give, place a small bit of butter on the handle of a spoon, make a tiny hole in it and drop in the croton oil (the dose is one to two minims), cover it over and place the butter far back on the patient's tongue. It will slide down the throat as it melts. Calomel powder may be given in the same way.

Cajuput oil is ordered for flatulence. It should be dropped on a lump of sugar.

Pills and *tabloids* are put on the tongue and swallowed with the help of a drink of water. Some patients find it difficult to swallow pills. In such a case, the pill may be cut up and put in a spoonful of jam.

A *powder* is best given by shaking it on to the back of the patient's tongue and then allowing him to take a drink. Some powders with a bitter taste like quinine are made up in cachets made of rice paper. They should be moistened with a little water in a spoon before swallowing. A small powder may be given to a young child by the nurse moistening a finger, rubbing the powder on it, then laying it on the baby's tongue and giving it a drink.

Capsules are small globes of gelatine containing some nauseous drug like castor oil. They are swallowed like a pill, the gelatine quickly dissolving in the stomach and letting the drug free.

It is a mistake for a nurse to disguise drugs for children by placing them in articles of food, especially if the child is old enough to appreciate the deception. It often gives a child a distaste for that particular commodity.

2. *Drugs Given by Inhalation.*

Alcohol, chloroform and ether are all given as inhalations to produce anæsthesia. In laryngitis and other throat affections inhalations of steam are frequently ordered. The drug ordered most commonly for these inhalations is Compound Tincture of Benzoin (Friar's Balsam). It is added to boiling water in an ordinary inhaler and the patient holds the mouth just over the glass mouth-piece and breathes in the vapour. A towel should be placed round the inhaler to prevent burning the patient, and the vessel should only be half filled; a small jug can be improvised as an inhaler by twisting a towel round the edge of the top of it. The patient rests his face on the towel and breathes in the steam from the water in the jug.

Drugs are also put on a sponge or cloth inside a respirator which covers the mouth.

Sometimes the drug is inhaled directly in the form of fumes. Nitrite of amyl is a very powerful restorative which is used in this way. It is made up in capsules containing from two to five minims. The capsule is broken in a handkerchief or piece of wool and the patient inhales the fumes. This drug quickens the heart's action, dilates the blood-vessels and lowers the blood-pressure.

3. *Drugs Given by Hypodermic Injection.*

The nurse is often confused by the use of the two words "hypodermic" and "subcutaneous". The words mean the same, viz., "under the skin".

Giving drugs hypodermically has some advantages. Their action is quicker and more certain. A drug that requires about twenty minutes to act through the stomach, requires about five minutes if given by injection under the skin. This method also avoids upsetting the stomach.

The injection is given with a small syringe to which a fine hollow needle is attached. There are two kinds of syringes, one made entirely of glass with the graduations marked on the glass barrel, and the other, which has the graduation marked on the rod of the piston and is fitted with a small nut, which can be adjusted to the number of minims after the syringe has been charged. All aseptic precautions should be taken in giving a hypodermic injection. The syringe, if of glass, can be boiled; if of metal it should have carbolic lotion drawn through it, and afterwards sterile water. The needle must always be boiled. An easy way is to boil it with the point upwards in a test tube over a spirit lamp. The drugs given hypodermically are in the form of solutions or they may be in the form of pellets which are dissolved in a little sterile water on a watch glass, and drawn up into the syringe.

The air in the syringe must be expelled by pressing the fluid through the needle. The skin is cleaned before the needle is inserted and the nurse must take proper care to see that the needle is not inserted over a bony prominence or near the line of the superficial blood-vessels. The outer side of the arms or legs is the usual place. The needle should be inserted in a slanting direction into the subcutaneous tissue. After injecting the fluid, the finger is pressed on the puncture and the needle withdrawn. The nurse may rub upwards gently to diffuse the solution.

To clean the hypodermic syringe after use.—Wash the needle and syringe in warm water and sterilize them. Draw a little absolute alcohol or methylated ether through the syringe and needle, then place a wire stilette through the needle. If the syringe is in frequent use, the syringe and needle are sometimes kept in a solution of carbolic acid between the injections. The nurse must, however, be careful to wash them well through sterile water before charging with the solution for injection.

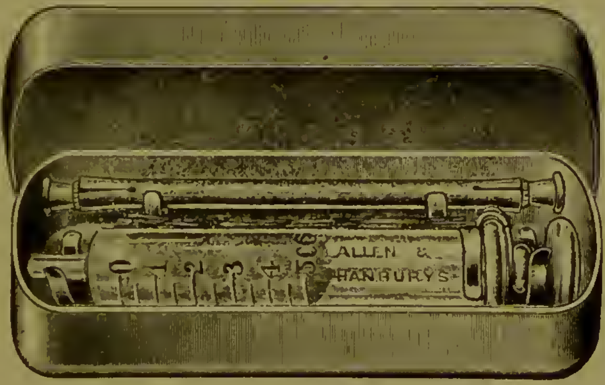

FIG. 22.—Hypodermic syringe.

Such drugs as salvarsan and mercury used in the treatment of syphilis, are given by what is called *intramuscular injection*. The injection is given into the muscles of the back or buttock, and the same antiseptic precautions are to be observed as in giving hypodermic injections.

4. *Drugs Administered by Inunction.*

This method is not so much used now, but in the treatment of syphilis in children inunction of mercurial ointment may be ordered. The part to be rubbed, generally the axilla or the groin or the abdomen, should be well-washed before the ointment is rubbed in. A glass applicator is sometimes used to save the nurse's hand from touching the drug.

In some conditions of wasting, cod-liver oil or olive oil rubbed into the tissues in this way is of value.

5. *Drugs Administered per Rectum.*

Drugs are given per rectum either in the form of enemata or of suppositories. Enemata and their administration have already been described.

Suppositories are conical-shaped preparations made of cocoa butter with which the drug to be given is incorporated. They are used in many rectal cases as a means of applying a local sedative. Opium is the drug in most common use in this form. The pointed end of the suppository is lubricated with vascline or oil and is slipped well into the rectum. The heat of the bowel melts the butter and sets the drug free.

In using nutrient suppositories the rectum should be emptied of fæces before the suppository is inserted.

When Medicine is Given.

The action of drugs is quicker if the stomach is empty, so purgatives which act quickly, such as seidlitz powders or mineral waters, are given an hour before breakfast, while slow-acting purgatives like pills are best given at bedtime. Oils and irritant or acid substances should be given immediately after food when there is food in the stomach. Alkaline tonics are given before food as a rule to promote digestion by stimulating the flow of gastric juice. Narcotics are given the last thing at night when the patient is ready to sleep and he should not be disturbed after the drug has been given.

Medicines ordered to be given after food are administered about half an hour after a meal; those ordered before food, about twenty minutes before.

A four-hourly medicine is given at these intervals during the day and also the night, and should be given punctually.

It is well for the nurse to remember that some patients are affected in a peculiar way by a drug and may show signs of poisoning after a small dose. This is called an idiosyncrasy, and the nurse must be on the outlook for it in administering medicines. In certain cases a drug if taken for some length of time accumulates in the system until symptoms of poisoning appear. With potent drugs like strychnine or digitalis this cumulative action must be remembered.

In nursing, the measures most commonly used are the measure of mass or dry measure, and the measure of volume or fluid measure. Domestic measures are also of value.

Dry Measure.			*Symbol.*
1 grain	=		gr. i.
20 grains	=	1 scruple	℈ i.
3 scruples	=	1 drachm	ʒ i.
8 drachms	=	1 ounce	℥ i.
16 ounces	=	1 pound	lb. i.

Fluid Measure.		*Symbol.*
1 minim	= 1 measured drop	♏ i.
60 minims	= 1 fluid drachm	ʒ i.
8 fluid drams	= 1 fluid ounce	℥ i.
20 fluid ounces	= 1 pint	O i.
8 pints	= 1 gallon	C i.

Domestic Measures.

One teaspoonful = 1 fluid drachm.
One dessertspoonful = 2 fluid drachms.
One tablespoonful = 4 fluid drachms or half an ounce.
A wineglassful = $2\frac{1}{2}$ fluid ounces.
A small teacup = about 7 ounces.
A breakfast-cup = ,, 10 ounces.
A tumbler = half a pint = 10 ounces.

The age of the patient is an important point in fixing the amount of a dose. Children as a rule are given smaller doses than adults, but can take as full doses as an adult of certain drugs. Children take opium very badly but can be given large doses of belladonna or arsenic.

To calculate the dose for a child under twelve years of age, we add twelve to the age in years and divide the age by the amount thus obtained, the answer being a fraction. Thus, if a child is four years old, we get $\frac{4}{4+12} = \frac{4}{16} = \frac{1}{4}$; and therefore the dose for a child of that age will be a fourth of the adult dose.

There are many terms and abbreviations used in prescriptions or on bottles of medicine which it is necessary to know. A list of the more usual ones is appended.

Abbreviation.	Words in Full.	Meaning.
a. c.	ante cibos	before food
p. c.	post cibos	after food
āā	ana	of each
n.	nocte	at night
m.	mane	in the morning
o. n.	omni nocte	every night
c. m.	cras mane	to-morrow morning
h. n.	hac nocte	to-night
altern dieb.	alternis diebus	every other day
b. i. d.	bis in die	twice a day
t. i. d.	ter in die	three times a day
t. d. s.	ter die sumendum	to be taken three times a day
q. 4^{tis} horis	quaque 4^{tis} horis	every four hours
p. r. n.	pro re natâ	as occasion requires
s. o. s.	si opus sit	if necessary
s. s. (ſs.)	semis	a half
	semel	once
stat.	statim	immediately
ex aq.	ex aqua	in water
pulv.	pulvis	a powder
ol.	oleum	oil, e.g. Ol. Ricini, castor oil
s. v. r.	spiritus vini rectificatus	rectified spirit
s. v. g.	spiritus vini gallici	brandy
Ung.	unguentum	ointment
ad lib.	ad libitum	at pleasure
c. c.	cubic centimetre	
co.	compositus	compound
p. a. a.	parti affectæ applicandum	to be applied to the affected part

Classification of Drugs and Their Effect.

Anæsthetics temporarily destroy sensibility, e.g. general anæsthetics—chloroform and ether; local anæsthetics—cocaine, eucaine or novocaine.

Antipyretics reduce abnormally high temperatures, e.g. antipyrin and phenacetin.

Antiseptics prevent the growth of germs, e.g. carbolic acid, mercury, iodine, etc.

Diaphoretics increase the amount of perspiration, e.g. pilocarpine and jaborandi.

Diuretics increase the flow of urine, e.g. buchu, digitalis.

Emetics produce vomiting, e.g. mustard and water, ipecacuanha, apomorphine.

Expectorants help to loosen the phlegm and to remove it from the bronchial tubes, e.g. squills, carbonate of ammonia.

Hypnotics induce sleep, e.g. chloral or sulphonal.

Anodynes relieve pain, e.g. belladonna, chloral.

Narcotics produce sleep and reduce pain, e.g. opium.

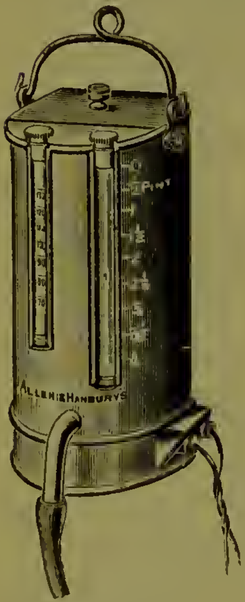

FIG. 23.

Tonics improve the general health by acting on different organs, e.g. arsenic, strychnine, quinine.

Styptics arrest local bleeding, e.g. iron and hamamelis.

Mydriatics dilate the pupil of the eye, e.g. atropine.

Myotics contract the pupil of the eye, e.g. eserine and opium.

ADMINISTRATION OF SALINE BY RECTUM.

Saline injection is frequently ordered when the patient has lost much blood during an operation or from some injury, or if he is suffering from shock. Three or four pints of saline solution (1 drachm of salt to a pint of sterile water) at a temperature of 105° F. are put in a douche can and a long rubber tube and catheter are attached to the nozzle of the can. The douche can is placed at a higher level than the patient. The catheter having been lubricated and passed into the rectum, the fluid is allowed to run in slowly at the rate of a pint in half an hour. The speed is graduated by means of a Spencer Well's forceps or a bulldog clip fixed to the tubing. The solution must be kept at the required heat by adding more hot lotion. A special apparatus is in the market (see Fig. 23) which is fitted up to connect with an electric switch, so that the solution can be kept at the original temperature all the time the injection is being given.

Continuous Infusion or Transfusion.

In the treatment of shock whether the result of accident or after operation, continuous infusion of saline subcutaneously is resorted to. This is done by introducing normal saline solution at a temperature of 110° F. into the subcutaneous tissues by means of siphonage. About four pints of sterile solution are placed in a large glass measure, which is placed in an enamel basin containing hot water so as to keep the lotion at the required heat. The apparatus must be on a higher level than the patient. A curved glass tube is placed in the lotion, the bend resting on the edge of the glass measure, and to the outside end a long piece of small-sized rubber tubing is fixed. A transfusion thermometer must be placed in the solution to test the temperature; the fluid should be at 115° F. at first as it will cool a little during the preparations. When the solution has been made to run through the tube by siphonage, the sterilized infusion needle is fixed to the end of the tube. The tubing is clipped near the end with bulldog clips or by an artery forceps. A proper siphon tube may be used

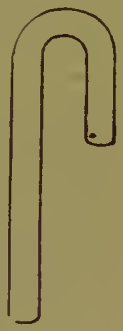

Fig. 24.

which has a metal valve and is bifurcated for part of its length, so that two needles may be fixed. A bulb in the course of the tube is squeezed to draw the fluid through. Clips or forceps are used to clip the tubes. To give the infusion, the inner side of the thigh or the flank is prepared as for an operation. The sterilized infusion needle being in readiness and the operator having scrubbed up, the needle is attached to the tubing and the point then inserted well into the subcutaneous tissues in an upward direction. It is attached to the skin below the point of insertion by a piece of strapping. On unfastening the clips, the fluid will begin to run. The nurse must be careful that it does not run more quickly than the patient is able to absorb it. If it does, the tube can be partially clipped so as to allow a smaller volume of the solution to pass through. As many as eight pints of saline may be given in this way.

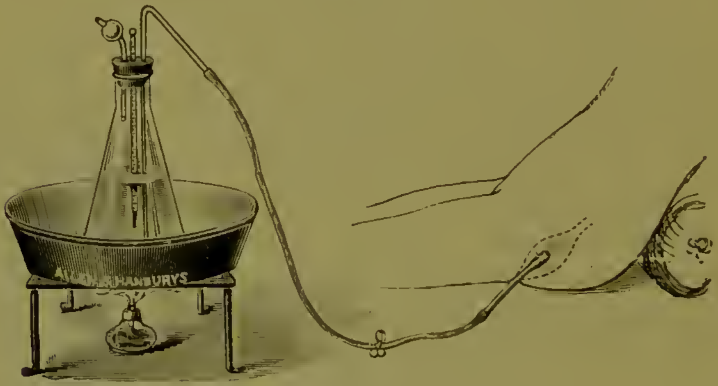

FIG. 25.—Apparatus used for Subcutaneous or Rectal Infusion.

In cases of wasting babies the saline solution is sometimes given into the peritoneal cavity. This is called *intra-peritoneal infusion*, and the fluid runs much quicker. This method is done by the doctor as a rule, because of the danger of puncturing the bowel.

During the administration of saline subcutaneously, the patient must be kept warm, well covered with blankets with a number of hot bottles placed round him. The nurse must see that the needles are not pulled out and must keep the solution at the right temperature by adding hot water to the outside basin. When the quantity of fluid has been given the needle is removed and the puncture sealed with a small collodion dressing. A thermos flask specially fitted up for the purpose is of great use in keeping the lotion at the required heat during the administration of saline.

INTRAVENOUS INFUSION.

By this method the normal saline solution is introduced directly into a vein. The vein most commonly selected for the purpose is the median basilic, one of the superficial veins of the arm near the bend of the elbow. For the operation of dissecting the vein, two pairs of artery forceps, a pair of dissecting forceps, a pair of scissors, a scalpel, aneurism needle, and a needle threaded with silk-worm gut, also a bull-dog clip should be sterilized and kept in readiness.

For the infusion, a funnel with tubing attached and a cannula fitted to it will be necessary; also a sterilized pint measure, three or four pints of saline solution, at 105° F., iodine for the preparatory dressing, sterile towels, swabs, dressings and bandages.

Absolute surgical cleanliness is essential in every detail. When all is in readiness, a bandage is firmly fixed on the arm above the elbow to compress the vein. A mackintosh is placed below the part while it is being cleaned up and painted with iodine. Sterile towels are then placed round the part and the vein is dissected out and a catgut ligature passed under it by means of the aneurism needle. The vein is then opened and the air having been expelled from the tube by running the lotion through it, the cannula is introduced into the vein, the bandage above the elbow being removed. The fluid is then allowed to run in, the quantity being decided upon by the surgeon. When the quantity has been given, the cannula is removed, the vein tied, a few silk-worm gut stitches put in and a dressing applied.

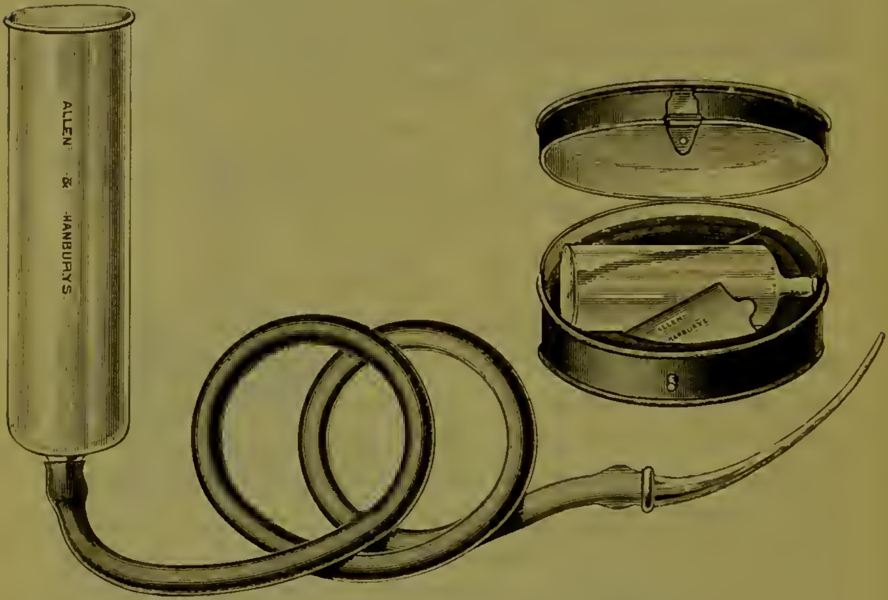

FIG. 26.—Apparatus for Intravenous Infusion.

The patient must be kept warm during the process.

GIVING OF STIMULANTS.

The stimulant ordered most frequently in hospital is brandy. Port wine is given sometimes to convalescent patients, and in critical cases champagne may be ordered.

The average quantity of brandy ordered is 3 ozs. in the day, and this should be divided up so that it is spread over the twenty-four hours. It should be diluted a little, about two parts of water to one of brandy.

In giving brandy to children it is unwise to mix it with a feed, as the child may refuse some of the milk and so be deprived of the stimulant. It is best to mix the brandy with a small quantity of the milk first, so that it will be taken.

Port wine is best given with a meal. Four or five ounces are usually ordered. It should be divided up and given with dinner and supper.

Champagne is best given in small doses frequently, generally an ounce or two every two hours.

The nurse must remember that alcohol is to be looked upon as a drug to be given only under the directions and by the order of the doctor in attendance on the case.

LECTURE II.

Feeding of the Sick—Feeding in Acute Diseases—Feeding in Chronic Diseases—Sick-Room Cookery.

FEEDING OF THE SICK.

ONE of the most important duties of the nurse and often a difficult one, is to see that her patients are taking enough nourishment to support the system and that the food is of such a kind as to throw as little work as possible on the organs of digestion which are enfeebled in acute disease.

Food is needed to maintain the strength of the patient, and to make up for the waste which is always going on, but more rapidly in all febrile diseases. In disease the powers of digestion are very much weakened and patients suffer as a rule from loss of appetite. The nurse must see that the food is light and nourishing, that it is properly prepared and served daintily and punctually at the stated intervals.

In hospitals, a diet scale is drawn up, with diets suitable to the condition of the patients. The three in most ordinary use are :

1. *Full diet* which is given to patients who are well enough to enjoy ordinary food.

2. *Convalescent diet* which consists of food more easily digested, such as custards, and fish or chicken instead of meat.

3. *Milk diet*, which consists of milk and beef-tea mainly, is ordered in most acute diseases.

It is necessary to make the food as inviting as possible, and much can be done by the nurse to stimulate the patient's appetite. It is a mistake to overload the plate, only a small quantity should be given. If the patient is disinclined for food, the very sight of a heaped-up plate is enough to prevent him from eating anything. When the patient has finished, what remains should be taken away and not left on the locker, as the sight of it is apt to nauseate the invalid.

A patient should not be wakened to take food unless it is absolutely necessary. This is a difficult point for a nurse to decide in some cases. If the patient has had very little sleep and has dropped off just when his food is due, the sleep will probably do him as much good as the nourishment. The nurse has to use her own discretion, but she must be careful to distinguish between a natural sleep and a condition of exhaustion from which the patient can easily be roused to take his food. If the nurse is in any doubt as to the proper course she must ask the doctor for definite instructions.

Helpless patients are fed by means of a feeding-cup which holds about half a pint of fluid. The two in common use are the feeding cup with the spout and the "Ideal" feeder. The latter has the great advantage over the ordinary feeder in that it has no spout to be kept clean. The spout of the feeding cup is always a worry to the nurse who is particular about cleanliness.

When feeding the patient the nurse can, by placing her left arm behind the pillow on which the patient's head is resting, raise it sufficiently to allow of food being swallowed easily. A small napkin or towel should be placed under the patient's chin to protect the bedclothes.

FEEDING IN ACUTE DISEASES.

The point we have to remember in feeding patients suffering from acute disease is that the digestion is impaired, so we must not give more food than the patient can digest.

Acute diseases are as a rule of short duration, so that the feeding in such cases differs from that in cases of illness which are of long duration. Whenever a temperature is above 102° F. the patient is ordered fever or milk diet.

Milk is a perfect food, containing all the elements necessary for building and feeding up the tissues. It is a fluid food and is more easily digested than solids, but cannot be given in unlimited quantity. Four pints in the twenty-four hours are ample for an adult patient, and three pints is a very usual quantity. It is usual to dilute the milk by adding soda-water, lime-water, or barley-water to it, so that it is more easily digested. Water is required by the system in febrile conditions and usually the patient is allowed to have as much as he likes, if he is taking his proper quantity of milk.

Nourishment in acute illnesses is given in small quantities and often. It is usual to feed the patient every two hours, day and night, which makes twelve feeds in the twenty-four hours. If we take the least quantity the patient should have in a day, as 3 pints (60 ozs.) and divide this by twelve, we find that each feed will consist of 5 ozs. of milk. This can be increased to 8 ozs. by the addition of plain water, or any other suitable fluid.

If milk disagrees with the patient, or if it passes in an undigested state in the motions, it may be necessary to peptonize it. The directions for making peptonized milk are given in the recipes for sick-room cookery. If badly made it tastes extremely bitter and nasty. It is advisable for the nurse to taste the peptonized milk herself before offering it to the patient.

Benger's and Mellin's foods are useful preparations if added to milk. They are artificially digested foods, but should only be used if other forms of milk have failed.

Whey is sometimes tried when milk disagrees with the invalid. It contains no casein, but artificially prepared caseins, such as Sanatogen or Plasmon, can be added to supply this property.

For patients who cannot take milk in any form albumen water may be ordered.

Beef-tea and broths are frequently used in feeding acute cases. One pint is as much as should be given in the twenty-four hours. Beef-tea is more stimulating than nourishing, but contains a large proportion of mineral salts which are useful in replacing what is being dispersed in large quantity by the excretory organs. Tea or coffee can generally be given in moderation, and, in small quantities added to milk, helps to vary the diet a little.

During convalescence when the temperature is reduced, the diet may be increased. Custards and white fish are given first, then the more easily digested meats.

Feeding in Chronic Diseases.

A chronic disease is one that lasts for some time, so the feeding will necessarily have to be on a more generous scale than that given in acute illnesses. The diet must be regulated so as to give as much nourishment as is necessary. There is often impairment of digestion which makes this difficult.

In chronic wasting diseases such as tuberculosis, or long surgical cases like discharging empyema, where there is very little fever, the patient is allowed an ordinary mixed diet, if his digestion is good.

In diabetes, the diet is an important part of the management. All carbohydrates are avoided. These are the foods which contain starch or sugar, such as bread, potatoes, peas, fruit, pastry, etc.; the diet should consist principally of meat with fat, eggs, green vegetables, tea or a little milk. Special kinds of bread, gluten or casoid bread and almond biscuits are given and the tea is sweetened with saccharin.

In the treatment of gout, the diet is restricted in some degree, more vegetables and less meat being taken. Sweet articles of diet are avoided.

The diet in aneurism is very restricted and is given in small quantities. The diet suggested by TUFNELL consisted of 10 ozs. of solid food (of which 3 ozs. are meat) and 8 ozs. of fluid per day. This is divided into three meals. Such a meagre diet has to be come to by degrees and it is so trying that patients are often unwilling to submit to it.

SICK ROOM COOKERY.

It is arranged in many hospitals that the nurses in training have a course of lectures in cookery, given by a recognized lecturer on the subject. For the nurse who takes up private nursing, this special course is most useful. All nurses, however, have to do a certain amount of cooking in the ward kitchens and I purpose giving a few recipes for the foods which are left as a rule for the nurse to prepare.

1. *To Peptonize Milk.*—Dissolve a Zymine peptonizing powder in 5 ozs. of hot water and add 15 ozs. of milk to make up a pint. Place the jug containing this mixture in a basin of hot water by the side of the fire for fifteen or

twenty minutes. If the peptonized milk is to be used for nutrient enemata, it can then be put on ice till needed. If it is for drinking, the mixture should be poured into a saucepan and brought quickly to the boil, but not allowed to boil more than a minute. It should be kept in a cool place.

2. *To Pancreatize Milk.*—Take 15 ozs. of milk and bring it to boiling point, then add 5 ozs. of water to make the pint. Add 3 drachms of Benger's Liquor Pancreaticus and place the milk in a warm place. Twenty minutes is sufficient to peptonize it.

3. *Albumin Water.*—Whisk up the whites of two eggs to a stiff froth and add these to a pint of cold boiled water, mixing them well. Another and easy method is to put the whites of the eggs and the water in a clean bottle, securely corked, and to shake vigorously till well mixed.

4. *Whey.*—This can be quickly prepared by boiling a pint of milk with two teaspoonfuls of lemon-juice. When the curd has set, it is strained through muslin and the whey pressed out.

Another way is to heat a pint of milk to a temperature of 100° F. A teaspoonful of rennet is then added and when curd has formed the whey is strained off and boiled.

5. *Beef-tea.*—Take 1 lb. of lean beef; remove all the fat and cut the meat into small squares. Place it in a jar with a pint of cold water, adding a little salt and a few peppercorns. Cover the jar and place it in a saucepan of boiling water. Let the beef-tea simmer for four or five hours without boiling, then strain through a fine colander and put aside to cool. Remove the fat and heat up as required. The jar may be placed in the oven instead of in a saucepan, but half a pint more water should be used for this method.

6. *Chicken-tea.*—Cut a chicken into pieces, breaking all

the bones. Put in an earthenware jar with a pint of cold water and a little salt. Cover the jar tightly and stand it in a saucepan of boiling water. Simmer for four or five hours and strain.

7. *Raw Meat Juice.*—Scrape two tablespoonfuls of raw beef, add a pinch of salt, and cover with 8 ozs. of water. Allow it to stand for two hours, then strain through muslin and put on ice. This juice does not keep more than twelve hours so should be made in small quantities. If it is to be given to adults, it is best served in a coloured claret glass.

8. *Barley Water.*—Wash 2 ozs. of pearl barley in several waters till it is quite clean, add a pint and a half of water to it and bring to the boil. Let it simmer for half an hour then strain. If the barley water is to be used as a drink, add the juice of a lemon and a little sugar.

9. *White Wine Whey.*—Boil half a pint of milk in a saucepan. Stir in a wineglassful of sherry and a little sugar. When the milk curdles bring it to the boil; let it stand for a few minutes, then strain off the whey.

10. *Imperial Drink.*—This is a refreshing beverage for fever patients. It is frequently ordered in cases of Bright's disease, and if sweetened with saccharin may be given to patients with diabetes.

Mix in a jug 1 teaspoonful of cream of tartar, the juice of a lemon and a few lumps of loaf sugar. Pour on a pint of boiling water. Let the mixture stand in the ice-box and strain off as wanted.

LECTURE III.

NURSING OF ACUTE CASES.

Diseases of the Respiratory Organs—Diseases of the Organs of Circulation—Diseases of the Urinary Organs.

I. DISEASES OF THE RESPIRATORY ORGANS.

1. *Pneumonia.*—The patient should be placed in a semi-recumbent position in a bed where there will be plenty of air without draught. The bedclothes must be light but warm. A flannel bedgown should be worn or a woollen jacket over the gown. The doctor may order him a "pneumonia jacket". This is made of quilted wool, shaped like a vest without sleeves, one side being left open and tied with tapes. It should reach from the neck to the waist. The patient's strength must be husbanded; so he should not be allowed to exert himself. The temperature, pulse and respiration are to be taken four-hourly, or more often if the case is a critical one. Nourishment is given in liquid form and in small quantities frequently. Milk and beef-tea are the foods most used. Three pints of milk with 1 pint of beef-tea in the twenty-four hours are sufficient. The patient is fed with regularity every two hours; 5 ozs. of milk, which may be diluted with water up to 8 ozs., being given, while the beef-tea is divided into four feeds of 5 ozs. each, two given in the day and two during the night; this makes a little variation from the milk diet. To relieve the

thirst, soda-water, lemonade or other cooling drinks may be given freely if the patient is taking his quantity of milk well. The bowels should be kept open and the number of stools noted. Poultices may be ordered to relieve the pain on the affected side. They should be changed every two hours. Ice applications in the form of ice-bags or ice-poultices are also used. Stimulants will be ordered if found necessary. They must be given with regularity and distributed equally over the twenty-four hours. Inhalations of oxygen, if there is cyanosis, are of great value. With a high temperature, sponging is resorted to. A patient with pneumonia requires watching, as delirium of a suicidal nature is a not uncommon complication. He should never be left alone for long, for the delirium may come on suddenly. In alcoholic subjects delirium tremens as a complication of pneumonia is often met with.

The temperature in pneumonia comes down in two ways:—by lysis which is a gradual fall occupying one or two days, or by crisis, when the temperature falls abruptly, the patient sweats profusely, and all the acute symptoms subside. At the time of crisis (about the eighth day of the illness) special care must be taken to guard the patient against chill. He should be rubbed down with warm towels when his garments get damp with sweating and a warm dry bedgown put on. Hot bottles and hot drinks should be given. If the patient is on stimulant it is well to give a dose at the time of the crisis.

2. *Broncho-Pneumonia.*—This disease occurs most often in young children and is characterized by small patches of consolidation in the lung. It is a frequent complication of measles, whooping-cough, and other fevers.

The temperature of the room should be warm, about

65° F., and if there is much bronchitis a steam kettle is used. A jacket poultice may be ordered or cold compresses are sometimes applied over the affected lung. A pneumonia jacket is useful. Fluid diet is given, and in extreme cases brandy is administered freely. Expectorants such as ammonium carbonate or ipecacuanha are given every four hours. In very young children the nurse may have to remove the sputum from the child's mouth with a piece of wool wrapped round her finger.

3. *Bronchitis.*—The room should be warm and the atmosphere kept moist by means of a bronchitis kettle. A mustard-leaf or linseed poultice applied to the chest helps to relieve the feeling of tightness. The diet should be light during the febrile stage but nutritious. In severe cases inhalations of oxygen are useful. For children an emetic of ipecacuanha wine (1 drachm repeated in fifteen minutes if necessary) is frequently used in order to get rid of the accumulated bronchial secretion. The patient with bronchitis requires care during convalescence, as he is liable to a fresh attack if exposed to any great change of temperature.

4. *Pleurisy.*—The nursing treatment of pleurisy is rest in bed with a plentiful supply of air. The diet should be light as there is generally a rise of temperature. The pain in the side is relieved by the application of poultices or counter-irritants. Strapping of the affected side to restrain the respiratory movements allays the pain to some extent. If there is pleural effusion, tincture of iodine may be painted over the affected side to encourage absorption, and the patient will probably require to be propped up in bed by means of a bed-rest owing to the dyspnœa caused by the pressure of fluid on the lung. The fluid may have to

be drawn off by tapping with an aspirator (Paracentesis Thoracis). This must be done aseptically as described in Lecture VIII to First Year Probationers. The fluid may become purulent, when the patient is said to have *Empyema.* This condition is treated by making an incision, under an anæsthetic, between the ribs, if necessary removing a piece of one or more ribs, and draining the pus by means of a large rubber tube with sterile dressings. Aseptic precautions are absolutely necessary. In *Pneumo-thorax* the pleural cavity is filled with air. The patient must be moved carefully. The intense pain is relieved by hot applications. Paracentesis is sometimes performed to let the air escape.

5. *Asthma* is caused by spasm of the muscles of the bronchial tubes, which produces sudden attacks of dyspnœa. Great attention has to be paid to the diet. It must be light and easily digested and no heavy food should be taken at night before retiring. During the attack, relief is given by inhaling nitrite of amyl or the fumes from burning a paper saturated with a solution of nitre. Smoking cigarettes made of chopped stramonium leaves has a good effect. The attacks are sometimes due to some obstruction of the nose such as adenoids. Surgical treatment is then necessary.

6. *Laryngitis.*—The patient should be kept in a warm atmosphere, 65° F., and the air rendered moist by the use of a bronchitis kettle. Steam inhalations, containing compound tincture of benzoin, 1 drachm to a pint of water, are used frequently. The diet must be entirely fluid as there is often great difficulty in swallowing. Small pieces of ice may be given to suck. The patient should not be allowed to use his voice.

Phthisis or Pulmonary Tuberculosis.—Phthisis or consumption is caused by the tubercle bacillus and is an infectious disease. The chief source of infection is the sputum. The lung is the organ commonly affected, but tubercular disease is met with in many other organs and also in the tissues.

Pure air is the first essential in nursing phthisical persons. The sanatorium or "open air" treatment is carried out. The patient is kept as much as possible in the open air· The sleeping-rooms or wards are thoroughly ventilated without draughts, so that the air is as pure inside as outside. The clothing of the patient must be warm, but light, flannel being worn next the skin. Plenty of good nourishing food is given and a moderate amount of exercise is advisable in early cases. Cod-liver oil is given more as a food than a drug, in doses of 1 to 4 drachms three times a day. It should always be given about twenty minutes after food. The cough is relieved by mixtures containing opium, or by antiseptic inhalations. If there is pain in the chest, counter-irritation may be useful. Tincture of iodine may be painted on the affected side or a blister applied. The night sweats of phthisis are very distressing. Tepid sponging is very comforting to the patient; a little vinegar or eau de Cologne may be added to the water. In laryngeal phthisis, the cough is very troublesome and there is pain and difficulty in breathing. Insufflations of a powder containing morphine and iodoform are used or a cocaine spray. If there is difficulty in swallowing fluids, foods such as cornflour, arrowroot or Benger's food are found useful. Hæmoptysis is a symptom frequently met with. Should it occur the patient must be kept in a semi-recumbent position. An ice-bag may be placed on the front of the chest over the lung from which the blood is coming (if the nurse knows which lung is diseased). Any food given should be cold and given in small quantities, and must be fluid. Ice may be given to suck. The nurse should have a hypodermic syringe with morphia at hand as the doctor may order an injection.

In nursing phthisis, special care must be taken of the sputum, as it is the chief source of infection if it is allowed to get dry. A little weak solution of formalin or sanitas should be put in the sputum-cup and the cups must be carefully washed and scalded daily. Paper handkerchiefs should be used and afterwards burnt. The nurse should warn the patient against swallowing the sputum, as by doing so the alimentary canal may become infected. The case must be treated as an infectious one and all the necessary precautions taken.

II. Diseases of the Organs of Circulation.

Pericarditis.—Absolute rest in the recumbent position is necessary in the nursing of this disease. The patient must be kept free from all worry or excitement and the diet should be chiefly milk during the acute stages. To relieve pain, if it is severe, leeches may be applied to the præcordia, or a light linseed or mustard poultice may have the same effect. After the application of leeches or poultices the region over the heart should be covered with cotton-wool. If there is fluid in the pericardial sac, iodine liniment or blisters may be used to help the absorption of the fluid, or if it is in large quantity, it may be removed by operation. Stimulants may be necessary throughout the course of the disease but must be given only by the doctor's orders. The bowels should be kept well opened so that as much fluid as possible is eliminated from the system.

Endocarditis.—The patient must be kept at perfect rest and any sudden movement forbidden. The food should be light but nourishing. Stimulants are generally given and pain over the heart may be relieved by counter-irritants.

Valvular Disease.—The treatment, as in all forms of heart disease, is to give the heart as little work to do as possible. Complete rest in the horizontal position is indicated, unless there is orthopnœa, when he must be propped up into a comfortable position with pillows. Sometimes the patient is allowed to sit in a chair with a support in front for him to lean on. The bowels should be kept loose, so as to draw off the surplus fluid from the tissues and to prevent the straining which would follow on constipation. The drug most commonly used in the treatment of heart disease is digitalis. It strengthens the action of the heart, and renders the pulse slower, stronger, and more regular. The nurse should note the pulse carefully in a patient on this drug, and if the rate of the pulse decreases rapidly the fact should be reported to the doctor as its action is sometimes cumulative.

The diet should be in moderate quantity, nourishing foods, light and easily digestible, are most suitable and too much fluid should not be given.

Sleeplessness, which is a common symptom, may be relieved by sponging the face and hands with hot water. If there is cyanosis, venesection, or the application of leeches may be necessary. Inhalations of oxygen are also useful. In treating cases of heart disease, massage is sometimes employed and has been found beneficial. In chronic cases, the treatment adopted at Nauheim is sometimes ordered. It consists of certain baths and a series of exercises, in which there are movements of the arms, body and legs.

Dropsy in Heart Disease.—The treatment consists in rest and depletion. Absolute rest of mind and body is essential. The patient must be moved carefully and especial care taken to prevent bed-sores which are liable to form. If the dropsy is advanced it may be necessary to use an arm-chair for the patient to sit up in.

The depletion, i.e. the withdrawal of fluid from the body, is accomplished by the use of purgatives and diuretics. The free action of the bowels and the increased quantity of urine passed relieve the circulation. Diaphoretics are also used to promote the action of the skin. If there is much fluid in the lower limbs (*anasarca*) they are punctured or drained by Southey's tubes (see Lecture VIII to First Year Probationers). In cases where the fluid is in the abdomen (*ascites*) tapping is resorted to.

In advanced cases, venesection may be of service.

The diet must be simple but ample and of a kind to be digested easily. The stomach should never be overloaded, as flatulence and distension may ensue.

Angina Pectoris is the name given to an intense pain in the region of the heart. It lasts a few seconds or minutes but may recur frequently within a short time. The remedy is a drug named nitrite of amyl which is made up in glass capsules containing from 3 to 5 minims. The capsule is crushed in a handkerchief or piece of lint and the patient inhales the vapour. This dilates the peripheral vessels, the face becomes flushed and the blood-vessels in the head throb. Relief is generally felt almost at once. Hot applications to the chest over the heart are sometimes efficacious. If the pain is very intense an injection of morphia may be ordered or the doctor may give an inhalation of chloroform.

Aneurism.—An aneurism is a dilatation of an artery at some part of its course. It is caused by anything which weakens the vessel, and increases the force of the blood-current. Aneurism of the thoracic aorta is the one most commonly met with. The patient must have complete rest in bed and not be allowed to sit up. The diet is very restricted, only as much food and drink being given as is necessary to support life. This is the diet recommended by Tufnell, and everything must be weighed or measured. Iodide of potassium is the drug given, as it has some influence upon the coagulation of blood in an aneurism. Opium and other sedatives are given to relieve pain and induce sleep.

Surgical treatment is sometimes resorted to in aneurism of arteries of the limbs—the vessel being ligatured above and below the swelling. Death is often due to rupture of the walls of the artery, when the aneurism occurs in the chest, when the vessel becomes more distended and thinner. The rupture may occur externally through the skin, or internally into the bronchi, trachea, or pleural cavities.

Phlebitis (Inflammation of a vein).—The patient must be kept in bed with the limb raised and fixed on a back-splint. The end of the bed should be raised on blocks. Warm antiseptic fomentations or poultices may be applied to ease the pain and reduce the swelling. The limb should be moved as little as possible, so it is better to use a many-tailed bandage to keep the hot applications in position.

Thrombosis is the process by which a clot of blood is locally formed in the interior of a blood-vessel. The clot is called a thrombus. The patient should be kept in bed. The limb must be raised and kept warm. Everything should be done to promote gentle circulation, and to prevent gangrene.

Embolism is the term applied to the process by which a thrombus or clot becomes detached and floats about in the blood-vessels, causing no trouble till it passes into a vessel too small to allow of movement, where it becomes impacted and obstructs the circulation. The obstructing clot is called an "embolus". If it lodges in the heart, brain, or lung it frequently proves fatal.

The patient must be kept quiet, absolute rest being essential.

III. DISEASES OF THE URINARY ORGANS.

Acute Nephritis or Acute Bright's Disease.—Acute nephritis is inflammation of the kidneys. It is a common complication of scarlet fever and of other specific fevers. It may be due to exposure to cold or wet and a severe type is caused frequently by pregnancy.

The patient is nursed in a warm room and in a bed well guarded against draught. He should be clothed in a flannel gown and should lie between blankets.

In mild cases farinaceous foods may be given, and as a beverage lemonade or Imperial drink. In acute cases of great severity the diet must be restricted to milk or milk and soda-water. If the lumbar pain is great, poultices or fomentations may be employed. Dry cupping is sometimes ordered but not often. The skin and bowels are made to act freely by the use of such drugs as liquor ammonii acetatis as a diaphoretic, and jalap powder as a purgative. The urine should be measured and saved.

If dropsy is marked, a vapour or a hot-air bath may be ordered to promote free perspiration. How to give these baths has already been described. Jaborandi or pilocarpine are given as diaphoretics. When the dropsy is extreme, the fluid is removed by puncturing or by the use of Southey's Tubes.

Uræmia.—Uræmia is a condition in which the urea is retained in the blood instead of being eliminated by the kidneys. It is a complication of acute nephritis, and the onset is marked by symptoms of headache, drowsiness, nausea and vomiting followed by convulsions and coma.

If there are uræmic convulsions, the patient's tongue should be guarded, the mouth being kept open by means of a tongue depressor or a stick placed between the teeth. Chloroform may be given by the doctor to check the convulsions. Venesection is also useful for this purpose. If there is coma, pilocarpine and purgatives are ordered. The nurse must take every precaution to protect the patient from cold or chill; warm flannel clothing should be worn.

Renal Calculus (Nephrolithiasis).—Renal calculus, or stone in the kidney, is characterized by lumbar pain and albumin, pus, and blood may be passed in the urine. Renal colic is caused by the spasmodic contraction of the ureter which is irritated by the passage of the stone. The pain is intense, and is accompanied by rigors and vomiting. The attacks are sometimes so severe that the patient writhes on the floor and sweats profusely. The urine is passed in very small quantity, perhaps only in drops, and may contain blood.

If there is a stone, rest in bed is necessary. If fixed in the kidney, the operation of nephrotomy or nephrolithotomy is done and the stone removed; if in the pelvis of the kidney—pyelotomy.

In the treatment of renal colic, to relieve the pain, poultices, fomentations or applications of belladonna are used. A hot bath is sometimes helpful, and if the pain is very severe the doctor may order an injection of morphia. The patient should be kept quiet in bed and warm drinks, such as barley-water, taken frequently.

Diabetes Mellitus may be considered here. There is a peculiar condition of the urine which is not caused by disease of the urinary organs. Diabetes mellitus is characterized by the passing of a large quantity of saccharine urine. The patient has great thirst, and generally a large appetite, but gets gradually weaker and loses flesh. The mouth and lips are dry, the tongue becomes large, red, and "beefy," and there is a sweet taste in the mouth. The amount of urine passed in a day may be from 8 to 12 pints and its specific gravity is from 1030 to 1060. The complications likely to occur are carbuncles, boils, pneumonia, phthisis, gangrene and coma, the latter frequently prove fatal. The treatment consists in trying to diminish the quantity of sugar in the urine by means of suitable diet and drugs, in keeping up the patient's strength, and in relieving any symptoms that may occur. All articles of diet which contain starch or sugar are prohibited. The foods allowed are meat with fat, eggs, ham, poultry, fish, soups if not thickened with flour, and green vegetables. Tea and coffee with very little milk, and certain wines are allowed. Special breads, such as gluten or casoid and bran or almond biscuits are given instead of bread. Saccharin is used in place of sugar to sweeten tea.

The drugs used in the treatment are morphia and codeine.

The nurse measures all the urine, carefully noting the quantity passed. It is frequently tested so as to estimate the amount of sugar passed in the day. She should also keep a record of the patient's weight, taking it at least once a week in order to see if the patient is losing weight.

Many patients die from coma. In diabetic coma the patient lies with eyes half-open, and may be roused by being spoken to but seems dazed. The breathing is deep slow and sighing; a sweetish odour like the smell of apples is sometimes noticed by those near the patient. There may be some delirium. This condition may be treated by the injection of saline solution either by rectum or subcutaneously. Bicarbonate of soda is given by mouth or by rectum. The patient must be kept warm, and if there is collapse the bed can be kept at a uniform heat by the aid of an electric light attached to a cradle. The condition is very hopeless.

LECTURE IV.

NURSING OF ACUTE CASES (*Continued*).

Diseases of the Alimentary System—Diseases of the Nervous System—General Diseases—Care of the Dead.

IV. Diseases of the Alimentary System.

Gastric Ulcer (ulcer of the stomach) occurs more frequently in women than in men and is a common case in female medical wards. It requires careful nursing as there are two great dangers in connexion with it. The ulcer may eat into a blood-vessel, when blood is vomited up (*Hæmatemesis*), or passed by the bowel in large quantities (*Melæna*), or it may perforate the wall of the stomach so that stomach contents are passed into the peritoneal cavity, setting up acute peritonitis.

The patient must have complete rest in bed for at least three weeks and only be allowed to take very slight exercise for some time after that. Very careful feeding is required. In mild cases, milk only, in small quantities, an ounce or two every two hours, is given. It may be diluted with lime-water or soda-water or it may be peptonized. The stomach is given as little to do as possible, so as to hasten the healing of the ulcer. If there is pain and frequent vomiting, nutrient enemata are used. Hot fomentations or a mustard-leaf applied to the epigastrium give relief in some cases. Bismuth is given as a drug and is administered before meals.

The operation of *gastro-enterostomy* is done in cases which have frequent recurrence of the pain and discomfort. The stomach is united to the jejunum and the ulcerated part is thus allowed to rest.

If hæmorrhage occurs, the patient must be kept at rest and no food given by the mouth for some hours. Ice may be given to suck and an ice-bag placed over the stomach. Usually nutrient enemata are ordered if the bleeding has been at all severe. An enema is given every four or six hours and the intense thirst from which the patient suffers is relieved by enemas of one pint of saline. Two of these are generally given in the twenty-four hours. When this method of feeding is resorted to, inflammation of the salivary glands (parotitis) is apt to develop, unless great care is taken of the mouth.

The patient may be allowed to rinse out her mouth with water frequently if she is not allowed to swallow any. Formamint lozenges given to suck are of value, as they stimulate the flow of saliva from the glands.

If perforation occurs, there will be sudden and severe abdominal pain with all the symptoms of collapse and vomiting. Nothing must be given by mouth, and the patient must be kept at absolute rest. An immediate operation is necessary; the abdomen is opened, the opening in the wall of the stomach sutured and the peritoneal cavity washed out.

Duodenal ulcer is a similar condition with similar complications and treatment. It occurs more frequently in men.

Cancer of the Stomach.—Daily washing out of the stomach with a siphon tube is most useful if there is vomiting and much dilatation. Boracic lotion or a weak solution of Condy's fluid may be used. This treatment is best done a short time before a meal. The method has been described in a previous lecture (Lecture VIII). The food must be light and nutritious, milk or peptonized milk being most frequently given. In some cases, farinaceous foods and eggs can be taken. The pain is relieved by opium in some form. The operation of gastro-enterostomy is sometimes performed to prolong life or gastrectomy may be performed in suitable cases.

Intestinal Obstruction.—The obstruction is caused in several ways; it may be by large gallstones or masses of fæcal matter; by a tumour of the bowel; and in children a frequent cause is intussusception, in which one portion of the bowel slips into the part immediately adjacent; by the bowel twisting or kinking on itself, or by strangulation of a hernia.

The symptoms are similar in most cases, but vary in severity. Constipation, vomiting, pain and distension of the abdomen are the chief symptoms, and one distinct feature of the vomited material is that it first consists of the contents of the stomach, then contains bile and finally becomes fæcal or stercoraceous in character. Pain is very severe in acute cases, and no motion or flatus is passed by rectum. In acute obstruction, there is collapse, the pulse is small and weak, the eyes sunken and the patient has an anxious expression.

The treatment depends on the condition of the patient. In many cases immediate operation is necessary, the abdomen being opened and the obstruction removed if possible. In cases before operation is decided upon, enemata may be ordered, either soap and water or soap and water with olive oil added to it. They must be given very carefully as the bowel may easily be ruptured. It is advisable to use a funnel and catheter instead of a Higginson's syringe to administer the enema. Relief of pain is gained by means of opium or morphia, but these are not always used as they mask two of the important signs—pain and vomiting. Turpentine stupes or linseed poultices applied to the abdomen are useful in relieving the pain and are frequently ordered. Belladonna or opium fomentations answer the same purpose. If an abdominal section has been performed, a pillow should be placed below the knees to take the strain off the abdominal muscles, and a cradle placed over the patient so that the bedclothes do not weigh heavily. Should there be vomiting the nurse must support the wound with one hand to prevent all strain. Definite orders will be given as to the feeding, whether anything can be given by mouth or if nutrient enemata are necessary. If there is flatulence a rectal tube may be used.

Appendicitis.—This is one of the most common diseases of the intestine. Appendicitis is inflammation of that part of the large bowel called the vermiform appendix. The symptoms are constipation, vomiting and pain and tenderness in the right iliac fossa, and fever. The abdomen may be distended and is generally rigid. An abscess may form or the wall of the appendix may give way, its contents escaping into the abdomen and setting up peritonitis.

In mild cases the patient is kept in bed, and given a light diet. Constipation is relieved by doses of castor-oil and the administration of simple or soap-and-water enemata. Local applications in the form of fomentations or poultices to the part affected give relief when the pain is severe and the bowels have been relieved by enemata.

If an abscess forms, surgical treatment will be necessary.

In nursing cases of appendicitis the nurse must watch carefully for and report any symptoms which point to the inflammation becoming ulcerative or perforative. There is then a sudden violent pain over the appendix, with an increased temperature and a rapid pulse. Vomiting and abdominal distension may also be present, and the condition may be ushered in by a rigor. Should these symptoms occur a nurse must report at once, as an immediate operation may be the only chance for the patient.

Peritonitis.—Acute peritonitis arises under many conditions. It may be set up by some lesion of the organs in the abdomen, such as ulceration and perforation of the stomach, ulceration of the small intestine in typhoid and sloughing of the vermiform appendix. Wounds of the peritoneum caused either by injury or operative procedure may also produce peritonitis.

The symptoms are acute pain, marked tenderness of the abdomen, vomiting, constipation, high temperature (103° or 104°), and quick small pulse. The patient lies with his knees drawn up in bed to relax the abdominal muscles. The respirations are thoracic, the abdomen being kept as rigid as possible. The tongue is dry and furred and hiccough is a common symptom.

The treatment consists in giving rest to the intestines. The patient is kept in bed, fed by nutrient enemata and the bowels are relieved by means of enemata. Opium is generally given to relieve the pain and keep the bowel at rest. Turpentine or laudanum fomentations give relief locally. Sometimes ice-bags or ice compresses are ordered for this purpose. If the distension is very marked, the rectal tube may be passed to draw off some of the gas. For the thirst, which is often great, ice may be given to suck or sips of hot water given frequently.

In cases where perforation is likely to take place or has taken place, all food is given by rectum. The latter condition, where the peritonitis is due to perforation of the stomach, appendix, or other abdominal organ, is treated by operation.

Jaundice.—Jaundice or *Icterus* is the term given to a yellow discoloration of the skin and other parts caused by bile-pigment getting into the blood circulation. It is caused by some obstruction to the flow of bile from the liver to the duodenum. The fæces in most cases are altered in colour, being whitish or clay-coloured, and the stools are often constipated. The pulse rate may be decreased. Itching is a symptom which often occurs.

The patient is fed on slops for the first few days. Some laxative is give if there is constipation. The itching is relieved by sponging with water containing vinegar or a little washing-soda.

If the jaundice is due to blocking of the bile ducts by gall-stones the condition is treated surgically.

Gall-stones.—These vary in size and in number, there may be one or two or several hundreds. When one leaves the gall-bladder and enters the bile duct the patient is seized with a sudden attack of biliary colic. This is accompanied by intense pain over the lower ribs on the right side, vomiting and collapse. If the stone remains in the common bile duct jaundice is produced.

To relieve the pain of biliary colic, a hot bath is given or hot applications are applied to the abdomen. Severe cases require a hypodermic injection of morphia.

The nurse may have to examine the fæces for gall-stones. The stools should be mixed with some carbolic lotion, broken up with a stick and passed through a sieve. Hard masses can be well washed by leaving the sieve under a running tap for some time till their nature is apparent.

Intestinal Worms.—The intestinal worms most commonly met with are of three kinds, namely: (1) thread-worms; (2) tape-worms; (3) round worms.

1. *The thread-worm*, so called because it resembles little bits of cotton, is about half an inch long and lives mostly in the colon and rectum. It sets up great irritation round the anus. These worms gain entrance into the system by the ova being taken in the food, or more frequently by means of ova adhering to the long and dirty finger-nails of the children affected when they scratch the itching parts.

To expel the parasites, a dose of castor-oil, or calomel and santonin, 1 gr. of each, may be given. When the purgative has acted the bowel is cleared by a large soap-and-water enema. Enemata of a solution of common salt (1 drachm to 5 ozs.), or an infusion of quassia (5 to 7 ozs.), may be given every alternate morning for a week. The parts round the anus must be kept very clean, washed after each motion and smeared with mercurial ointment.

Thread-worms are sometimes found in the appendix when it is operated on.

2. *The tape-worm* is a flat, ribbon-shaped worm very narrow at the head end and broad at the other. It is from 10 to 12 ft. long and is divided into segments. It usually lives in the small intestine and is difficult to dislodge. If the head is not passed the worm grows again.

The child should be confined to bed and should be kept on a restricted diet of soups, broth and jellies, but no farinaceous foods. The bowels are kept open by laxatives. The drug given to kill the worm is extract of male fern (1 drachm to 1½ drachms), suspended in mucilage. The bowel having been emptied by a large dose of castor-oil administered the previous evening, the male fern is given in the early morning, the child not having had any food. The bowels must be emptied by the administration of more castor-oil or an enema. The head of the tape-worm must be looked for when the worm has been passed. The segments are easily recognized in the stools.

3. *The round worm* occurs singly or in large numbers. It resembles the garden worm and lives mostly in the small intestine, but may reach the stomach and be vomited. The symptoms produced by it are diarrhœa, convulsions, and grinding of the teeth.

A dose of santonin (1 grain), given every night for three nights, followed by a dose of senna or salts in the morning is the usual remedy.

It is well for the nurse to be reminded that the use of santonin causes the urine to have a bright yellow colour and may cause "yellow vision" in the patient.

V. Diseases of the Nervous System.

Paralysis.—Paralysis or loss of power in the muscles is due generally to some lesion of the nervous system. The two forms most frequently seen are paralysis of one half of the body known as *Hemiplegia*, and paralysis of both lower extremities called *Paraplegia.*

(*a*) *Hemiplegia* is caused by hæmorrhage into the brain from the bursting of a blood-vessel, or by injury to the surface of the brain from blows. Owing to the crossing of the nerves in the medulla oblongata, a hæmorrhage on the left side of the brain will produce paralysis of the right side of the body and vice versa. When the injury is on the left side, the centre for speech is sometimes affected, causing aphasia—loss of speech.

The patient is kept in the recumbent position with the head and shoulders slightly raised. The stertorous breathing may be diminished by placing the patient on one side. An ice-bag is applied to the head to help in arresting the internal bleeding. If unconscious a quickly acting purge such as croton-oil or calomel is given, and if the patient remains unconscious for any length of time it may be necessary to pass a catheter. Nasal or rectal feeding may be resorted to. The position must be changed frequently and all precautions taken to prevent the formation of bedsores. A water-bed is sometimes used. Care must be exercised in the use of hot bottles as the patient has no sensation on one side and may easily be burnt.

If there is no loss of consciousness the patient is kept in bed and is given a low diet of fish, milk and custard pudding. After several weeks, electricity is used, and the limbs are massaged.

(*b*) *Paraplegia.*—This is the name given to paralysis of both lower extremities. It may be due to fracture of the spine, or to some disease of the spinal cord such as myelitis. There is partial or complete paralysis of both legs, with numbness and absence of sensation in the legs, and up to the middle of the abdomen; the sphincters lose their power and there is incontinence of urine and fæces, or there may be retention of urine and constipation. Bedsores are very liable to form.

In nursing such a case a water-bed is necessary. Great care must be taken as to cleanliness, and the position of the patient should be changed frequently. The same precautions about hot bottles must be taken as in nursing cases of hemiplegia. Plenty of nourishing food may be given. The two complications likely to arise are bedsores and cystitis. Every possible precaution must be taken to prevent the formation of bedsores. If there is retention of urine, the urine will have to be drawn off. This must be done with aseptic precautions. If cystitis has occurred, the bladder will be washed out with some mild antiseptic. In the convalescent period electrical treatment and massage are used to stimulate the wasted muscles.

Epilepsy.—Epilepsy is a functional disorder of the brain marked by sudden loss of consciousness with or without convulsions. It has two forms.

1. *Grand mal*—in which the fits are severe and there is coma or convulsions.

2. *Petit mal*—characterised by a momentary loss of consciousness.

The epileptic fit has four stages.

1. The *aura* or warning.
2. *The state of unconsciousness* which is often ushered in by a sudden cry.
3. *Convulsions* with frothing at the mouth, twitching of the face and body and passing of the urine and fæces unconsciously. The tongue may be bitten.
4. *Recovery.*—The patient regains consciousness, but remains drowsy and falls into a sleep.

The fit can sometimes be stopped if there is a well-marked aura, by rubbing the limb or by putting some constriction on the finger or arm. During a fit a gag must be placed between the patient's teeth to prevent the tongue being bitten. The convulsive movements should not be restrained so long as the patient is in no danger of hurting himself. The head should be put on one side if there is vomiting while the patient is unconscious. A patient liable to epileptic fits should always remove any false teeth at night before going to sleep.

The treatment in the interval between the fits consists in giving light food, keeping the bowels well open and allowing a certain amount of exercise regularly. The drugs given are the bromides of potassium and sodium.

Meningitis.—Meningitis is inflammation of the "meninges" or membranes of the brain.

It may be *suppurative*, *tubercular* or the *posterior basal meningitis* of infants.

Suppurative meningitis is generally due to inflammation of the middle ear, whence the infection spreads through the bone into the interior of the skull and the membranes are covered with a layer of pus.

Tubercular meningitis is caused by tubercle bacilli setting up inflammation in the membranes.

The posterior basal meningitis of infants is characterized by extreme retraction of the head called "cervical opisthotonos". The symptoms of this condition are vomiting, convulsions, with drowsiness or screaming. The vomiting of meningitis is erratic; it comes and goes without any apparent cause and though aggravated by food is not caused by it.

Treatment.—The patient is placed in a bed in a darkened room, protected from light and noise. Cold is applied to the head by means of ice-caps. The bowels must be kept active. The nurse must be careful to support the head while lifting. If the eyes are wide open while the child is comatose, they must be bathed with boracic lotion and the lids kept closed by placing a piece of lint over each eyelid and securing it by a bandage. The patient is fed frequently in small doses, milk being the chief food. If the vomiting is very persistent nutrient enemata may be given, and in the later stages, when there is unconsciousness, nasal feeding is necessary. Blisters are sometimes applied to the back of the neck.

Chorea.—Chorea or St. Vitus's dance is, like epilepsy, a functional disease of the nervous system. The disease is characterized by jerky movements of the body and twitchings of the muscles of the face. It is closely related to rheumatic fever, a large proportion of patients suffering from chorea having had rheumatism. It is mainly a disease of childhood and is more frequent in girls than in boys. The nursing treatment is very important. The child is kept in bed, the bed being in a corner if possible with a screen placed round it, so that the child is not seen by the other patients in the ward. The nurse must avoid startling the child by any sudden movement. A nourishing but easily digested diet should be given and the child allowed plenty of fresh air. The bowels should be opened regularly. Arsenic is the drug most commonly employed in the treatment. The nurse must be on the watch for signs of overdosing, viz., vomiting and pain in the epigastrium. The child should be allowed to use a spoon only for eating solid food, as with her jerky movements she is apt to injure her mouth with the prongs of a fork. In extreme cases, well padded bedsides may be required, and great care must be taken to prevent bedsores. Such cases are better on a water bed. In some cases it is necessary to give the food per rectum.

VI. General Diseases.

Acute Rheumatism.—Acute Rheumatism or Rheumatic Fever is a painful affection of the joints, marked by fever and profuse sweating.

The patient is nursed between blankets and should be dressed in a flannel bedgown. The joints should be wrapped in wool, and the bed cradle used to keep the weight of the bedclothes off the painful limbs. The nurse must be careful to protect the patient from any unnecessary movement or jarring. Milk diet is given in the acute stages and during convalescence, fish and milk puddings, but no meat. Lemonade and other drinks may be given to allay thirst. The drugs used are chiefly preparations of salicylate of soda, which reduce the pain and temperature rapidly. Frequent sponging with tepid or warm water is allowed as a rule to prevent the patient feeling chilled from the evaporation of sweat. Any exertion on the part of the patient during the acute stage is to be avoided, as heart disease is a common complication. Soothing remedies are used for the severe pain in the joints; glycerine and belladonna may be painted on or laudanum fomentations applied.

Hyperpyrexia is a grave complication which must be watched for. The joint pains subside suddenly and the sweating ceases. The temperature rises rapidly to anything between 105° and 110° F. and the patient is very restless. Unless this temperature is reduced death occurs in from twelve to twenty-four hours. Cold baths are necessary. The patient is kept in one till the temperature falls to between 100° and 101° F. If baths are not available a cold pack or ice rubbed over the surface of the body may be tried. Enemata of iced water are also given.

Gout.—Gout is a constitutional disease marked by inflammation of the smaller joints, very commonly that of the big toe. The acute form comes on suddenly with severe pain in the affected part, which is swollen, tense and very tender.

The patient must be put to bed and the painful limb placed in an easy position—a cradle being arranged to keep the bedclothes from resting on it. Soothing applications may be applied or the joint may be wrapped up in cotton-wool, covered with gutta-percha tissue. The diet must be very restricted, only slops being given during the acute stage. Later on fish and white meat are allowed, but red meat is withheld. The drug ordered in this disease is colchicum. The prolonged use of it may cause faintness and purging and the nurse should be on the watch for these symptoms. It is essential that the bowels should be kept open and purgatives are given for this purpose.

In chronic gout, mineral waters are ordered or a course of waters at some watering-place, such as Buxton or Carlsbad. A more generous diet is allowed than in acute cases. Massage is sometimes found useful in the treatment of chronic gout.

Delirium Tremens.—This disease is generally the result of drinking for a long period and to excess. It occurs in an alcoholic patient in the course of any severe disease or after a serious accident or shock. The symptoms are loss of appetite, sleeplessness and muscular tremors, with extreme restlessness and confused illusions. There may be a suicidal or homicidal tendency.

The nursing of such cases is very trying. In hospitals a male attendant is generally engaged to watch the patient as he must not be left night or day. His movements must not be restrained by any mechanical device, and anything with which he could do himself or others an injury must be taken away. The greatest effort must be made to get the patient to eat. The food should consist of eggs, broths, beef-tea, custards and milk. Sometimes it is necessary to feed by the rectum. In most cases the drink is entirely stopped, but, in cases of great prostration, a little brandy or whisky is given. To induce sleep, which is as necessary as food, some hypnotic, such as bromide of potash or chloral, is generally ordered.

CARE OF THE DEAD.

If it is at all possible two nurses should perform the last duties to a patient and the duty should be done with all reverence and decency. As soon as the friends have left the ward, the body should be undressed and straightened, the eyes closed and if necessary kept closed by wet pads of wool. The mouth must also be kept shut by placing a roller bandage under the jaw, or by bandaging the jaw with a four-tailed bandage. Any jewellery worn by the patient should be removed and given into the care of the sister of the ward, who will hand it over to the steward of the hospital. The body is covered with a sheet and left for an hour till "rigor mortis" or stiffening sets in. It is then washed with soap and water and as there is often a great deal of discharge after death, the orifices are plugged with cotton-wool. Any wound must be covered with a fresh piece of lint and bandaged with a clean bandage. The hair is brushed and neatly arranged. If the patient is a woman, it may be arranged in two plaits tied with white ribbon or bandage. The body is then dressed in a white shirt or nightgown or a shroud. In hospital a card, with the name of the patient, the ward, and the date and hour of the death written on it, is pinned to the sheet or nightgown. A clean sheet is placed over the body and it is then ready for removal to the mortuary.

When a patient dies of an infectious disease, the body should be washed with a disinfectant.

LECTURE V.

INFECTIOUS DISEASES.

The Specific Fevers—The Stages of a Fever—Nursing of Infectious Diseases—Typhus Fever—Relapsing Fever—Enteric Fever—Scarlet Fever—Measles—Chicken-pox—Smallpox.

An *infectious disease* is one which may be transmitted from one person to another either by direct personal contact or may be conveyed by means of the air or carried by food, water, articles of clothing, or any other media. A *contagious disease* is one which is communicated by direct contact, so that a contagious disease is always infectious but an infectious disease is not necessarily a contagious one.

Infection is spread by means of minute living organisms called *germs* or *micro-organisms.* These germs enter the body, multiply and produce a condition of inflammation and poisoning which is accompanied by fever and a distinctive rash or eruption in some diseases. Each disease has its own particular micro-organisms and it enters the system in different ways. Thus it enters the lungs by being inhaled, in cases of scarlet fever and smallpox; it enters the alimentary canal by being swallowed, in cholera, and typhoid fever; in syphilis and gonorrhœa the germ enters by the generative mucous membrane; in hydrophobia and malaria the micro-organism enters the body by abrasions of the skin from the bite of a dog or the bite of a mosquito.

The Specific Fevers, so called because they are produced by a special or specific cause, run a definite course which may be divided into *five stages or periods.*

1. *The Period of Incubation* in which the germ having entered the body is growing and multiplying, but has not yet produced any signs of illness.

2. *The Period of Invasion*, when the germ has produced its poison to such a degree that the whole body is affected and we have special symptoms, such as rise of temperature, loss of appetite, vomiting, etc.

3. *The Period of Advance*, sometimes spoken of as the period of eruption, when the disease is fully developed and the rash has come out.

4. *The Period of Defervescence or Decline*, during which the temperature falls suddenly by crisis or gradually by lysis.

5. *The Period of Convalescence* or the period in which the patient is getting well. The length of time varies in each fever.

Nursing of Infectious Diseases.

Typhus Fever (*also called Camp Fever, Jail Fever*).

This fever is now very rarely met with in this country. It is due to overcrowding and filth and was at one time common in prisons and in the poorer parts of large towns.

The infection is often carried by fleas or bugs and this should be remembered when admitting a patient.

The *incubation* period is very variable—from four to fifteen days. The *invasion* is sudden and is characterized by headache, loss of appetite, pains in the back and limbs and high temperature. The rash appears on the fourth or fifth day but may be later. It appears on the abdomen and chest and on the backs of the hands and wrists. It is called the "mulberry" rash of typhus and presents a dusky red mottling of the skin with small subcutaneous hæmorrhages. A feature of the disease is a peculiar odour compared to that of mice or rotten straw. The temperature falls suddenly, generally about the fourteenth day. The most common complications are pneumonia, and inflammation of the salivary glands.

Nursing.—The room or ward must be kept well ventilated. The treatment is best carried out under open-air conditions. The nurse should be careful not to inhale the patient's breath directly. The nervous symptoms are very marked, so the patient must be kept absolutely quiet. Tepid sponging is frequently ordered to reduce the temperature. The mouth requires attention frequently. Bedsores are very liable to form and must be prevented by every means. If there is stupor and exhaustion the bladder may get distended. The urine must be drawn off by means of a catheter if necessary. The food must be in fluid form and as nourishing as possible. If there is much headache or delirium cold may be applied to the head in the form of an ice-cap or Leiter's coils. Constipation is treated by the use of enemata.

Relapsing Fever (*Famine Fever—Hunger Typhus*).

This fever generally occurs in epidemics and like typhus attacks the poor in districts where they are overcrowded and destitute. It is a short fever which ends suddenly in six or seven days and is followed by a relapse of the same kind after an interval of about a week. The *incubation period* varies from one to sixteen days. The *onset* is sudden, beginning with rigors, followed by headache and pains in the back and limbs. The temperature rises rapidly to 103° and in a few days may reach 106° or 107° F. The pulse and respirations are very rapid. Sleeplessness and delirium are frequent complications. Between the fifth and seventh days the temperature falls abruptly, there is profuse perspiration and the patient feels very weak. At this time there may be diarrhœa or nose-bleeding. The patient recovers quickly and seems well in two or three days, but about the fourteenth day, that is a week after the first attack, he has a relapse and all the symptoms re-appear. The relapse is generally of a milder order than the first attack.

Nursing.—The room must be well ventilated, but the patient must be guarded against chills. Tepid sponging may be useful in reducing the temperature. The body will require to be sponged and dried after the periods of sweating, and flannel should be worn. Cold to the head may relieve the intense headaches, and if the pains in the limbs are very severe, morphia or opium may be ordered. The nurse must watch for symptoms of heart failure. Fluid food is necessary in the acute stages, but in the interval between the attacks solid food may be given.

Enteric Fever (*Typhoid Fever—Gastric Fever*).

Typhoid Fever, so called because it was thought to resemble typhus, is caused by a germ (the bacillus typhosus) which is introduced into the body in various ways. The infection is contained in the evacuations from the bowel and is spread by the germs getting into water, milk or other articles of diet. The disease is commonest among young people between the ages of ten and twenty-five and is more prevalent during the months from August to November. The seat of disease is the small intestine in the lower part of the ileum and the parts affected are the Peyer's patches and solitary glands.

The *four stages* of the disease are :—

First Week.—Swelling and inflammation of the Peyer's patches.

Second Week.—Ulceration sets in.

Third Week.—The sloughs separate, leaving an open sore.

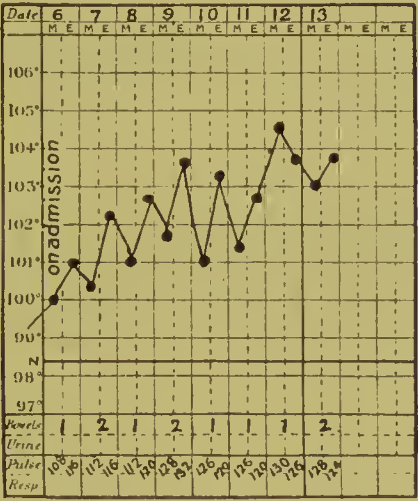

FIG. 27.—Chart of a case of Typhoid Fever showing typical rise of Temperature during the first week.

Fourth Week.—The ulcers are healing. They are not completely healed till two or three weeks after the attack.

The *Incubation* period is from seven to twenty-one days but it is very variable. The *invasion* is insidious. The patient has a general feeling of malaise, severe headache, pain in the limbs and he may have epistaxis. The abdomen may be swollen and tender and the spleen enlarged. The temperature rises gradually, reaching its highest point about the end of the first week. During the second week the temperature continues to rise two degrees at night and comes down one degree in the morning, giving a chart with a zig-zag appearance which is very typical of this disease. The *rash* appears from the seventh to the tenth day. It is not always present but when seen consists of rose-coloured spots which disappear on pressure. It comes out in crops on the chest

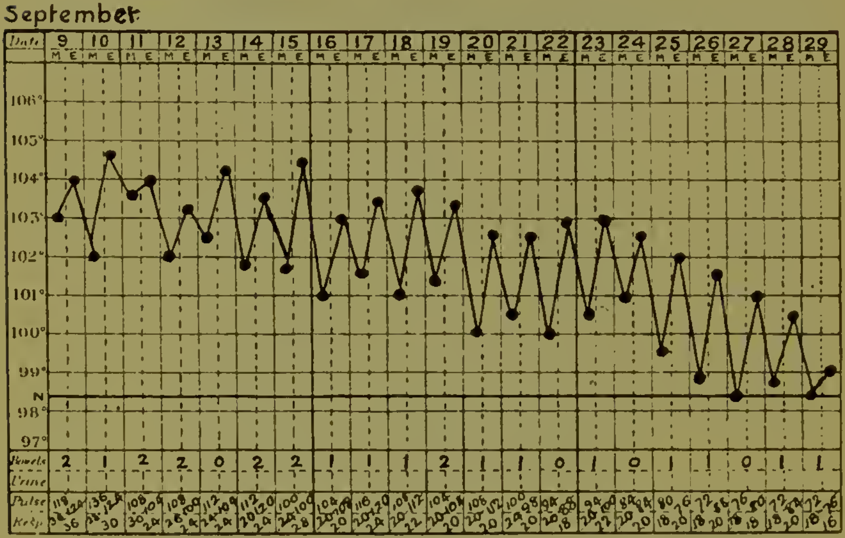

FIG. 28.—Temperature Chart of case of Typhoid Fever.

and abdomen and the spots fade away in a few days. The bowels are generally loose, the stools being known as the "pea-soup" stools of typhoid fever. In some cases the stools are constipated and occasionally blood is passed. Restlessness, sleeplessness and delirium are common symptoms during the second and third week of the illness. In severe cases the patient may be in the condition called the *typhoid state.* There is then great muscular weakness and apathy. The patient may be sleepless and delirious and may pick at the bedclothes. The breathing is very irregular and may present the type known as "Cheyne-Stokes". The lips are parched and covered with sordes. The stools and urine may be passed under the patient, and bedsores are very apt to form. The complications likely to occur in the course of typhoid fever are many and very serious. The chief are pneumonia, hæmorrhage from the bowel, perforation, peritonitis, tympanites and bedsores.

Nursing.—The room should be well ventilated and kept at a temperature of about 60° F. In some hospitals cases of typhoid fever are nursed in the ordinary medical wards. The source of infection being the stools and urine, all disinfectant precautions are taken with these and with the bed linen of the patient (see under Disinfection). As there is ulceration of the small intestine with the chance of a blood-vessel being opened and severe hæmorrhage ensuing or the thinned wall of the bowel perforating, it is absolutely necessary that the patient should be kept at rest and not allowed to move unnecessarily.

Feeding.—The greatest care must also be taken with the diet. Overfeeding is one of the great dangers. If the patient can digest milk, two and a half or three pints in the twenty-four hours, varied with a pint of beef-tea or chicken-tea carefully strained may be given. If milk does not agree and vomiting occurs, or if curds are found in the stools, it should be further diluted or it may be peptonized. The milk is best given diluted with a little hot water. For an adult 4 or 5 ozs. every two hours are sufficient. The nurse should see that the patient does not take too long over drinking it. It should be disposed of in five or ten minutes, so that it may be digested before the next feed is due. If there is no diarrhœa beef-tea may be given and makes a little variety from the monotony of milk diet. A pint is given in the twenty-four hours, divided into three portions, one given at midday, the second in the evening for supper, and the third in the early hours of the morning when the vitality is low. The patient should be allowed to drink plenty of water, as much as six pints in the day. This has a very beneficial action, the free supply of fluid eliminating the toxins, and making the patient more comfortable. Aerated waters are not permissible, as they are apt to encourage meteorism. Fruit is forbidden because of the seeds, but the juice of an orange or of grapes, carefully strained through muslin, is very grateful to the patient and can generally be given if there is no diarrhœa. During convalescence careful feeding is still necessary, beginning with light milk puddings, jellies, pounded potatoes with a little gravy, steamed fish and gradually increasing to an ordinary diet. If there is great prostration during the third and fourth weeks, the patient may have to be fed frequently in small quantities with concentrated foods such as beef or chicken jelly or the yolk of an egg beaten up in brandy. Stimulants such as brandy or champagne may be necessary.

The different symptoms will be treated as they arise. For high fever tepid or cold sponging or the cold bath may be required. To assist in the nursing an open bed-gown should be used—open all down the back, so that it is less likely to get soiled with discharges. A bedpan can generally be given, but in very critical cases it may be dangerous to lift the patient, and the stools have to be passed on pads of tow. For *excessive diarrhœa*, starch and opium enemata may be ordered. If *constipation* is present it is always treated by enemata, never by purgatives. The abdomen may become very distended with gas (*meteorism*) from an unsuitable diet. Enemata of starch mucilage containing half an ounce of turpentine or of tincture of asafœtida may be ordered. Pain is relieved by the application of hot stupes.

Hæmorrhage.—A sudden fall of temperature with an increased pulse rate occurring at the end of the second week to the end of the fourth week should make the nurse suspicious of hæmorrhage. This condition is usually accompanied by such signs as prostration, pallor of the face, abdominal pain, and a feeling of coldness. The blood may be passed in small or large quantity in the stool. This must be reported at once. Cold may be applied on the right side of the abdomen and ice may be given to suck. The patient must be kept absolutely still and not allowed to move. No stimulants should be given.

Perforation.—In cases where the bowel perforates, all the symptoms of hæmorrhage will be present and there will also be severe abdominal pain and distension. The pulse is rapid and weak, and there may be vomiting which has a fæcal odour. This condition occurs late in the disease, generally in the third, fourth, or fifth weeks, and is usually fatal, except in cases where an immediate operation is performed.

Peritonitis.—This complication is indicated by intense abdominal pain, with a rapid and thready pulse. The abdomen is swollen and tender.

The patient must be kept absolutely at rest. A cradle placed over the abdomen will keep the weight of the bedclothes from the abdomen. No food must be given, but small pieces of ice to suck are admissible. An ice-bag may be placed on the right iliac fossa, or a very light poultice applied.

Convalescence.—During this period the patient requires constant care. No solid food must be given till the temperature has been normal for eight days, and if the temperature goes up again the fluid diet must be returned to.

Scarlet Fever (*Scarlatina*).

Scarlet Fever is a common disease in this country and is most prevalent in the autumn months. Children are very subject to it and it is very fatal when it attacks them in their third or fourth year. It is highly infectious, the poison being carried by clothing, books or anything which has been in the sick-room and specially by the discharges from the nose, throat and ears of the patient. The patient is infectious from the beginning to the end of the disease. *Isolation* and *disinfection* are most necessary.

The *incubation period* is variable but is seldom more than a week, and may be only three or four days.

The *invasion* is short, generally about twenty-four hours. The onset is marked by convulsions or rigors, vomiting, frontal headache, and pains in the limbs. The temperature is high, 103° or 104° F. and the pulse is rapid. There is sore throat, the tonsils and uvula being bright red in colour. The glands of the neck are often swollen. In children "circumoral pallor" is often very marked, the area round the mouth and nose being very pale against the brightly flushed cheeks.

The rash appears on the second day, showing first on the sides of the neck and upper part of the chest, then spreading downwards to the trunk and extremities. It consists of minute red spots set closely together, so that the skin has a bright red colour. The skin is very dry and hot. The rash begins to fade on the fourth, fifth or sixth day, and desquamation commences with its disappearance. The tongue is red, raw and furred and presents the characteristics which have given it the name of "strawberry tongue".

The Complications of scarlet fever are nephritis, rheumatism, ear trouble (chiefly otorrhœa), and heart disease.

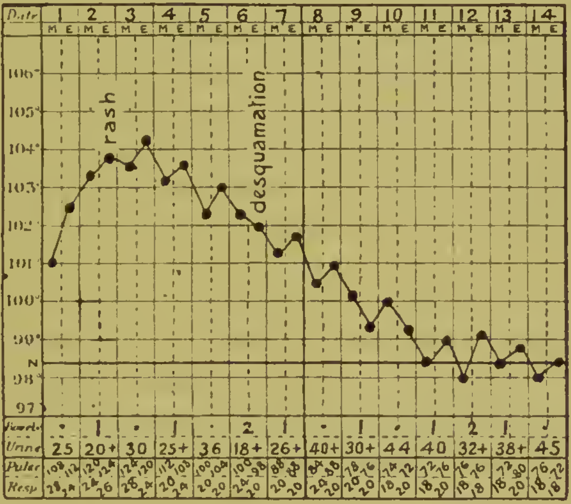

FIG. 20.—Temperature Chart for the first two weeks in a case of Scarlet Fever.

Nursing.—Isolation in a well-ventilated room with complete rest in bed for at least three weeks is necessary. Flannel bedgowns should be worn. The throat requires much attention. It may be sprayed or painted with a throat brush. Gargling is useful, but this method is not possible with young children. Fomentations or poultices may be ordered for the swollen glands. The temperature, pulse and respiration are taken every four hours. If fever is high, tepid or cold sponging may help to reduce it. The diet is important. Milk only is given while there is fever but when the temperature has fallen, usually after the rash has appeared, milk puddings, tea and bread and butter, jellies, white soups and stewed fruits may be given. Water and cooling drinks are given freely. This diet is continued for three weeks, after which a little white meat or fish is allowed. The bowels are kept open and the urine should be measured every day and tested frequently. The body should be washed over every day when the temperature has fallen and desquamation has begun. Care should be taken that the flakes of skin are not scattered about. The skin may be rubbed with some weak carbolic oil or oil of eucalyptus. Every precaution must be taken to guard the patient against chill.

Nephritis is a common complication and is often the result of a chill or some error of diet. The urine has a smoky colour, showing the presence of blood. There may be swelling of the eyelids and face, or swelling of the feet and legs. The patient should be nursed between blankets and kept on milk diet. Hot-air baths or hot packs may be ordered. The bowels are kept freely open and plenty of fluid is given to drink.

Rheumatism is another complication. There is a rise of temperature, with pain and swelling of the limbs and sweating. As in nephritis the patient is put between blankets, the inflamed joints are wrapped in cotton-wool and he is restricted to milk diet. When the sweating is profuse the bedgown and blankets require frequent changing.

Otorrhœa is treated with poultices or fomentations. If the ear is discharging, syringing will be done regularly with boracic lotion.

Pericarditis or Endocarditis also occurs as a complication and must be treated in the usual way.

Measles (*Morbilli*).

Measles is essentially a disease of childhood. The most infectious period is the invasion stage and the infection is carried by the catarrhal discharges from the nose and throat.

The *incubation* period is ten to fifteen days.

The *invasion* is marked by all the symptoms of a severe cold, running at the eyes and nose (coryza), headache and chilliness. There is usually "photophobia". There may be sore throat and a cough. The temperature may rise to 104° or 105° and falls as the rash fades. Vomiting and convulsions are common symptoms. Small spots appear on the inside of the mouth (Koplik's spots) and are a help in diagnosis.

The *rash* appears on the fourth day and is usually first seen at the roots of the hair and behind the ears. It consists of slightly raised red spots which tend to arrange themselves in crescentic form leaving spaces of clear skin. The rash gradually spreads over the whole body, lasting about three days. There may be a fine branny desquamation about the tenth day. The most usual *complications of the disease* are, pneumonia, bronchitis, broncho-pneumonia, eye and ear affections, diarrhœa and occasionally cancrum oris.

Nursing.—The patient is kept in bed for at least ten days in most cases; in the more severe for much longer. A well-ventilated room with an even temperature is necessary to avoid the risk of lung complications. If the eyes are painful, the light must be subdued. The diet should be light but nutritious. In the feverish stage it is better to be liquid

—milk and chicken-tea. Drinks may be given often if nourishment is being taken well.

If there is high temperature in severe cases, tepid sponging is resorted to as a means of reducing it. For the irritation of the skin, sponging with a tepid solution of water and bicarbonate of soda is useful. Sometimes a mustard bath is ordered if there are serious symptoms and the rash is delayed.

For the *chest complications* which may arise, the room should be rather warmer, 65° F. Steam-kettles or a pneumonia jacket may be ordered. Linseed poultices are often required.

In *ophthalmia*, which is a common complication, great care must be taken with any wool or dressings used. They must be burnt at once. The eyes are bathed with warm boracic lotion and if necessary shaded from the light. The nose and mouth also require attention.

German Measles ("Rubella") is quite distinct from measles and is not so severe. The fever is slight, and the rash, which resembles that of both measles and scarlet fever, comes out on the first or second day. The nursing does not differ materially from that of ordinary measles.

Chicken-pox (*Varicella*).

Chicken-pox is a mild disease, which generally lasts for about a fortnight and is highly infectious.

The *period of incubation* is usually from twelve to twenty-one days.

The *invasion* is hardly noticeable; there may be a little fever and some restlessness.

The *rash* appears on the first or second day and may be the first indication of the disease. It consists of little red spots which soon become vesicular. They come out in crops and as the vesicles dry up crusts form which drop off and leave no scar. They generally appear on the chest first, then on the face and body.

Nursing.—No special treatment is required. The child is isolated and kept in a warm room. The diet should be light but nourishing, plenty of milk, beef-tea and eggs. The child should not be allowed to scratch the spots because if the scabs are rubbed or picked off a small pit is left as in smallpox. A simple ointment may be applied to allay the irritation and prevent scratching. If the skin is very irritable, a dusting powder of boracic acid, zinc oxide and starch, equal parts, may be used.

Smallpox (*Variola*).

Smallpox is much more rarely met with since vaccination was made compulsory.

The *incubation period* is from twelve to fourteen days.

The *period of invasion* is marked by vomiting, rigor, headache, pain in the back and high temperature. In children there may be convulsions.

The *rash* appears on the third day and is seen first on the head and face. Before the spots come out a shotty feeling as of very small peas under the skin can be felt if the fingers are passed over it. The rash is at first like red pimples, after a few days the spots become vesicular and the vesicles have a little depression in the centre. By the eighth day the eruption is fully out and the vesicles become pustular. This stage is marked by a fresh attack of fever. The pustules rupture and form scabs, which fall off about the twelfth to fourteenth day. During the purulent stage there is much swelling and redness of the skin.

Varieties of Smallpox.—These are *four* in number.

1. *Modified smallpox* occurs when patients are partially protected by a previous attack or by vaccination. The eruption is small and does not become pustular and the disease is of a mild type.

2. *Discrete Smallpox.*—When the individual pocks remain separate and do not coalesce.

3. *Confluent Smallpox.*—When the rash is very profuse and the spots run together forming large blebs. In this form the temperature does not fall to normal when the rash appears as in mild cases.

4. *Malignant Smallpox.*—When the blebs are filled with blood instead of serum, and bleeding also occurs from the ears, eyes, throat, rectum and other organs. In this form death before the end of the first week is usual.

The *complications of smallpox* are laryngitis, bronchitis, and pneumonia. There is very often serious eye trouble and common sequelæ are abscesses and erysipelas.

Vaccination is undoubtedly a safeguard and does much to reduce the mortality in those attacked by the disease. Under English law, every child (unless certified to be unfit) must be vaccinated before it is six months old. It is advisable that this vaccination should be repeated every seven or ten years, and if there is an outbreak of smallpox every one likely to be exposed to infection should be re-vaccinated.

Nursing.—Skilful nursing is most necessary. As in enteric fever the nursing is of paramount importance. Absolute isolation is imperative. It is usual to build isolation hospitals for the treatment of smallpox in an isolated spot at some distance from a town. The skin requires special care. Some emollient, such as vaseline or oil of eucalyptus, is applied to the surface of the body to allay the irritation and to loosen the scabs. When the scabs begin to dry up, warm baths may be given if the patient's condition will permit. Iced compresses may be applied to the face if there is much pain and swelling. The hair is generally cut short and the nails should be trimmed or the hands rolled in wool to prevent the patient scratching the pocks. The severe itching may be relieved by sponging the body with dilute acetic acid and water. The mouth and eyes require careful attention. Bedsores are liable to form from the spots on the back. Water beds or pillows are used as a preventative. The patient may be delirious and the delirium is of a violent type. No undue force must be used to restrain the patient but for a man a male attendant may be necessary.

All the discharges from the patient must be looked upon as highly infectious and should be treated as such. A cotton garment should be worn next the skin and flannel outside that for the warmth which is necessary to prevent chest complications.

The eyes require special care. Frequent bathing with boracic lotion or a weak solution of perchloride of mercury is necessary to keep them clean.

The odour from a case of smallpox is very disagreeable. This may be modified by the use of deodorisers such as sanitas or chlorine. Frequent changing of the bed-linen and clothing is also required. Free ventilation is necessary throughout the disease.

The period of infection lasts from the incubation till all discharges and desquamation have ceased, and may be for eight or ten weeks.

LECTURE VI.

INFECTIOUS DISEASES (*Continued*).

Diphtheria — Whooping-Cough — Mumps — Influenza — Dysentery— Cholera — Cerebro-Spinal Meningitis — Syphilis — Disinfectants and Disinfection.

NURSING OF INFECTIOUS DISEASES (*Continued*).

Diphtheria.

Diphtheria is a contagious disease, characterized by a local exudation on the mucous surface, generally of the throat, producing the so-called "membrane". This membrane is like yellowish wash-leather and appears first on the tonsils, and may then spread to the soft palate, to the larynx or to the nose. The disease is caused by a micro-organism known as the Klebs-Loeffler bacillus, after the two pathologists who described it. The infection is carried by the discharges from the throat and larynx and outbreaks of the disease have been traced to bad sanitary arrangements and to contaminated milk. Diphtheria is essentially a disease of the first ten years of life—children up to the age of five being very liable to it. In the second year the disease is very common.

The *incubation period* is from two to seven days. The *invasion* is insidious. There may be a feeling of malaise, with chilliness, loss of appetite and vomiting. This is followed by a rise of temperature, quickened pulse and sore throat. A general redness is seen all over the tonsils and soft palate and patches of false membrane form on them. This membrane is very adherent and when removed leaves a raw bleeding surface. When the membrane extends into the larynx the disease is known as *membranous croup*. A very acute form is caused by the membrane spreading into the nose. This is called *nasal diphtheria*. Diphtheria can also affect wounds. The temperature may be high, but is generally about 102° or 103° F. A low temperature may denote a slight attack or a very acute one with great prostration.

Diphtheria affecting the larynx produces huskiness of the voice, a hoarse and brassy cough with noisy, stridulous breathing. Recession or sucking in of the intercostal spaces with each inspiration is a dangerous symptom and is the signal that tracheotomy or intubation is necessary.

The *complications of diphtheria* most usually met with are albuminuria, bronchitis, pneumonia, paralysis and heart failure.

Nursing.—The nursing of diphtheria requires much watchfulness and care on the part of the nurse. A patient with the disease should never be left alone as alarming symptoms frequently arise with little if any warning.

The patient must be kept flat in bed for at least three weeks, however mild the attack is. A small feather pillow for the head may be allowed and moving from side to side is permissible, but the patient must not sit up for any purpose. The temperature of the room should be warm, about 65° F., and in laryngeal diphtheria steam is generally ordered.

The strength of the patient must be maintained by giving nourishment frequently. The diet will consist mainly of milk (which should be boiled) beef-tea and eggs. The feeding is often very difficult, owing to the pain of swallowing or to the nausea and sickness from which the patient suffers. In such cases rectal feeding by enemata may be required. Stimulants are as a rule necessary. The throat is sprayed, painted or swabbed constantly or a gargle may be used. Poultices or fomentations may be applied on the neck. All rags or swabs used for wiping away discharges must be burnt immediately after use. The urine should be tested frequently as albumen is often present.

In the treatment of diphtheria, injections of *diphtheria antitoxin* are given. This antitoxin or serum is made up in small vials containing so many units. It is usual to administer about 3000 units of the antitoxin if the disease is diagnosed early. Five or six thousand units may be given if the disease is at a later stage. In times of epidemics of the disease doses of 1000 units are often given as a preventative measure. In giving the injection, the skin must be prepared as for a surgical operation. The parts chosen for the injection are generally near the shoulder-blade or in the flank. The antitoxin syringe and needle must be boiled and the most rigid aseptic precautions taken in injecting the serum. The puncture may be sealed with adhesive plaster passed through a flame or by a collodion dressing.

Serum Sickness.—Following the administration of serum, the symptoms usually met with are—a rash, some pyrexia, and pain in the joints.

The rash varies considerably; it may be like that of measles or of scarlet fever or of urticaria. The rashes are very irritable and appear two or three days after the serum is administered. A rise of temperature generally accompanies the rash.

The joint pains may occur alone or with the rash. There is very little swelling, but much tenderness and pain, which is aggravated by any movement.

Paralysis is a common complication of diphtheria and one for which the nurse must be on the outlook. The paralysis may affect any muscle but generally begins in the soft palate. The first signs are shown by a nasal twang in the speech and regurgitation of fluids through the nose.

In paralysis of the larynx, the patient has fits of coughing when drinking. The eyes are sometimes affected, producing a squint. Paralysis of the limbs is very seldom complete and only lasts for a few months.

Nasal feeding may be necessary in cases of paralysis of the soft palate.

Heart failure is one of the most fatal symptoms in diphtheria. Its onset is shown by a weak and irregular pulse sometimes slow, sometimes quick, and by incessant vomiting. Little can be done, but the patient's head should be lowered and the foot of the bed raised. Some stimulant, such as strychnine or ether is given, and hot cloths may be placed over the region of the heart. Rectal feeding may be necessary if the vomiting is persistent.

If *tracheotomy* is performed (that is if an opening is made in the upper part of the trachea into which a silver tube is inserted through which the patient can breathe) the nurse must keep the inner tube quite clean by removing it every two hours and thoroughly cleansing it in some lotion. As the patient is generally a child, the arms should be secured by a clove-hitch bandage to the sides of the cot, so that the tube cannot be reached. A porringer with some sterile water containing a trachea dilator, a pair of scissors, and a tracheotomy tube of the same size as the patient has in the trachea, all ready threaded with tape, should be kept constantly by the side of the bed in case they are required for immediate use.

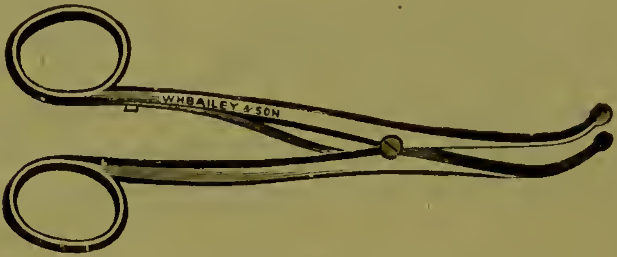

FIG. 30.—Tracheal Dilator.

Whooping Cough (*Pertussis*).

Whooping-Cough is a contagious disease characterized by a peculiar convulsive cough which is followed by a long-drawn inspiration through the nearly closed glottis, by which a crowing noise or "whoop" is produced. It often occurs in epidemics during the spring and autumn. It is common in children between the ages of one and seven and frequently follows measles.

The *incubation period* is ten to fourteen days.

The *period of invasion* begins with symptoms of a bad cold, slight fever, and a hard, dry cough. In the second stage the cough comes in paroxysms and the child gets red in the face and often vomits. The cough is more marked and troublesome at night. In severe attacks, the child becomes cyanosed, the face gets congested, with the eyes starting from the head. Death may be due to spasm during a fit of coughing.

The *complications* are usually chest troubles (especially broncho-pneumonia), convulsions and wasting. Hæmorrhage from the nose and mouth are sometimes met with.

Nursing.—During the catarrhal stage keep the child in a warm room free from draughts. The ventilation must be free. When the whoops have developed and the fever has subsided the child may be allowed up and can go out of doors if the weather is suitable and he is warmly clad. The diet should be light but nourishing. If there is vomiting after the paroxysms of coughing, the food should be administered immediately after each attack, so as to give the stomach time to digest and absorb the food before the next fit of coughing. In severe cases it is well to peptonize the milk. Throat sprays and steam inhalations are often of use. The child should be supported during the attacks of coughing, and if very young should be held in the arms during a seizure. Hot poultices or rubbing the chest with camphorated liniment help to relieve the paroxysms.

In the convalescent stage, a change of air and a tonic, or cod-liver oil are useful in cutting short the disease, which is sometimes of very long duration.

Mumps (*Epidemic Parotitis*).

Mumps is an acute infectious disease, supposed to be due to a germ which has not yet been discovered. It is shown by swelling of the parotid glands and their surroundings. It generally attacks children between the ages of five and fifteen.

The *incubation period* is twelve days to twenty-six days.

The *invasion* is marked by rise of temperature, vomiting, swelling and pain under one ear with difficulty in opening the mouth and in swallowing. In the later stage both sides may be affected.

There may be swelling of glands in other parts of the body as a complication.

Nursing.—The patient should be kept warm. Hot applications, poultices or poppy-head fomentations allay the pain which is often very severe.

The diet should be light and must be given in liquid form till the swelling has subsided. Feeding is difficult owing to the stiffness of the jaws. The mouth requires careful attention.

The *quarantine period* should not be less than twenty-six days.

Influenza (*La Grippe*).

Influenza is an epidemic disease very prevalent in the early spring. It is an infectious fever.

The *incubation period* is short, from one to three days. The symptoms are varied, but the *invasion* is generally marked by a general feeling of illness, with severe headache, pains in the back and limbs, and some fever.

The form the disease takes varies in different epidemics. It may be:—

1. *Febrile*, with rigors, high temperature, quick pulse, nasal catarrh, swollen fauces and tonsils with headache and pains in the muscles.
2. *Respiratory* with fever, headache, prostration, rapid breathing with troublesome cough and dyspnœa.
3. *Abdominal* with vomiting, diarrhœa and abdominal pain.

Mental depression is a common symptom in all these forms.

Nursing.—The patient must be kept in bed from the first and remain there till the temperature has been normal for a week. The intense headache may be relieved by darkening the room and applying cold compresses. The diet must be fluid and nourishing during the early stages, but more generous afterwards. Stimulants are often necessary. If there is profuse perspiration the clothing should be changed frequently and the skin sponged with warm water. The limbs may be wrapped in wool and bandaged. Care is needed to guard against chills.

Dysentery.

Dysentery is an inflammation of the mucous membrane of the colon with such symptoms as acute pain in the abdomen, a constant desire to go to stool, straining, sweating and restlessness.

The stools may contain fæcal matter but frequently consist entirely of mucus or mucus tinged with blood. The stools are very foul smelling. In severe cases, the patient may be delirious or may be in a state of coma.

Nursing.—The patient must be kept in bed and entirely at rest. Warmth is very essential and all the stools must be disinfected (as in typhoid fever) before being emptied. Hot fomentations may be applied to the abdomen if the pain is severe.

The diet requires great care. In the early stages, albumen water, barley water, whey or peptonized milk may be ordered, and any food given must be warm only—that is, it must not be hot or cold. In the later stages, junket, Benger's food, and arrowroot are allowed. Small pieces of ice may be given to suck to relieve the intense thirst.

In chronic cases of dysentery a more liberal diet is permitted and the patient is allowed to be up for part of the day and to have plenty of fresh air and amusement.

Cholera.

Cholera is an acute epidemic disease of which the principal feature is a profuse discharge of watery evacuations from the bowel. It is due to a definite bacillus called the "comma bacillus" because of its resemblance to a comma. It is rarely met with in temperate regions.

The *incubation period* is short, usually from a few hours to three days.

The *onset* is sudden. It generally begins with diarrhœa, or, if there is no diarrhœa, the patient is depressed and suffers from headache, vertigo, and noises in the head. Later there is violent purging and the stools are very copious, eventually they look like water in which rice has been boiled (rice-water stools). Sometimes they are tinged with blood, but there is very little pain or griping. Severe vomiting follows, and the patient can retain nothing in the stomach. He suffers from agonizing cramp in the extremities and abdomen, and soon passes into a state of collapse. His pulse is thready, rapid, and almost imperceptible. The temperature may register 92° F. in the axilla, although taken in the rectum it may be as high as 103° to 105° F. The patient is restless and complains of thirst. There may be a cold, clammy sweat all over the body. The mind is sometimes quite clear. The disease terminates either in coma and death or in reaction and recovery.

Nursing.—The patient must be nursed in a warm, well-ventilated room and the recumbent position must be kept all through the illness. In the first stage little nourishment, can be taken, as the stomach immediately rejects it. Stimulants are given and iced-water or ice. The body must be kept warm by means of warm blankets and hot bottles. If there is sweating the patient should be rubbed down with warm dry towels. The cramp is relieved by gentle friction. In cases of collapse, intravenous or subcutaneous injections of saline solution may be tried.

During the stage of reaction, the application of heat is not necessary. Light nutritious food should be given frequently. Diluted milk, albumen water, iced milk and then broth or meat juice may be given.

If there is much diarrhœa in the reactionary stage, it is treated by opiates or astringents. The stools should be disinfected as in typhoid.

Retention of urine must be carefully watched for. The quantity of urine passed should be measured and noted. Suppression of urine will be treated by hot fomentations or poultices or counter-irritation in the form of cupping. Bedsores are liable to form and must be prevented by the usual precautions. During an epidemic of cholera, nurses should be on their guard against any indiscretion in their diet. Diarrhœa in the slightest degree should be reported. All milk and water should be boiled before use. Every precaution in the way of disinfection must be taken to ensure the safety of the nurse herself and the community generally.

Cerebro-Spinal Meningitis (*Epidemic Meningitis—Spotted Fever*).

Cerebro-Spinal Meningitis is an acute infectious disease which is generally epidemic. It is characterized by inflammation of the membranes covering the brain and spinal cord. It is believed to be caused by a diplococcus. It is most common in young persons and males are affected more frequently than females.

The *incubation period* is uncertain, but is probably short.

The *onset* is sudden and is marked by intense pain in the head, back and joints, shivering, high fever and vomiting. The muscles of the body become rigid and the head is retracted. There may be convulsions and delirium followed by coma. Eruptions appear on the skin which has given the disease the name of "*spotted fever*". Eye and ear complications are common. The bowels are constipated. The temperature is often subnormal, but is sometimes very high just before death. If there is recovery the patient is very emaciated and usually mentally deficient.

Nursing.—The patient must be isolated and nursed in a dark, well-ventilated room. Quietness is essential. Hot baths are given frequently, as many as three in a day. Cold applications to the head relieve the pain. The diet should be light and nourishing and given in generous quantity. If there is difficulty in swallowing nasal feeding is employed. Eye trouble will require to be treated by regular bathing with boracic lotion. Great care will be needed to prevent bed-sores forming.

Lumbar puncture is done both as a means of diagnosis and for treatment. The spinal fluid is drawn off and examined for the germ. If the fluid is purulent, from 15 c.c. to 40 c.c. of *Flexner's Anti-Meningitis Serum* are injected into the spinal canal daily for three or four days. After each injection the foot of the bed should be raised for a few hours to assist the serum to reach the base of the brain.

Syphilis.

Syphilis is an infective disease due to the entrance into the body of a virus or poison. It is generally communicated from one individual to another by contact infection. When syphilis is communicated in this way the first sign of the disease appears on the part of the body inoculated by the poison and is called a primary sore or chancre. The disease is divided into *three periods.*

1. *The primary period*—the time between the first infection and the first constitutional signs—generally from four to six weeks. During this period the primary sore develops and the nearest glands enlarge.

2. *The secondary period* is the time when the patient suffers from constitutional manifestations, such as skin eruptions, enlargement of glands, eye and throat affections. This lasts for one or two years.

3. *The tertiary period* follows on the secondary and may last during life if treatment has been neglected. The lesions may occur in any part of the body, the skin or mucous membranes, the tissues or the internal organs. The tertiary lesion is known as a "Gumma". It consists of granulation tissue, somewhat like a tubercular nodule and is made up of fibrous tissue externally with cod-flesh like matter in the centre.

Congenital or Inherited Syphilis is met with in the children of parents suffering from the disease. The baby may be born with all the appearance of perfect health. After a few weeks it ceases to thrive, becomes shrivelled and sallow, skin eruptions break out and the child has "*snuffles*" from inflammation of the nose. This inflammation may extend to the nasal bones, interfering with their development, so that the bridge of the nose is flattened. This condition is known as the "*saddle nose*" deformity. The child also develops condylomata about the anus, and there may be bossing of the bones of the skull (*craniotabes*).

In later days the child shows other signs. The chief of these are :—Inflammation of the cornea of the eyes with dimness of vision. The permanent incisor teeth are dwarfed and stand somewhat apart in the gum. They are peg-shaped and notched at the edges. Ulcers appear about the corners of the mouth, and periostitis of bones is common.

Nursing.—In nursing syphilitic patients it is essential for the nurse to understand that the disease can be carried by direct contact if there is an actual sore. The sores are contagious in their primary and secondary stages. The infection may be conveyed by kissing, by using the same tongue depressor or by the use of anything that has come in contact with a patient suffering from the disease. Everything used for a patient suffering from syphilis must be marked and kept for that patient only. The nurse must never forget that she may, by carelessness in detail, convey this dread disease to another patient.

The two drugs used in the treatment are mercury and iodide of potassium. The first is used in the primary and secondary stages, while iodide of potassium is of great value in the tertiary stage. Mercury is given in the form of pills or mixtures by mouth or it may be used as ointment by inunction or as a dusting powder. The nurse must watch for symptoms of mercurial poisoning and of iodism if either of these drugs is being given.

A *new remedy* for this disease has been discovered, by Professor Ehrlich of Frankfort, and is now much used. Some good results have been reported. It receives the name *606* from the fact that Professor Ehrlich discovered it after trying 605 different preparations of arsenic. The original 606, otherwise known as *salvarsan*, has now been replaced by *neo-salvarsan* the effect of which is the same but without the dangers of the original preparation. The injection is given by means of a large-bore needle into the muscles below the scapula. The skin is prepared as for operations, being made surgically clean in the ordinary way, or it may be painted with iodine. Salvarsan is also given in some cases by intravenous infusion. For this treatment the patient should be prepared as for operation, omitting the enema.

DISINFECTANTS AND DISINFECTION.

A *disinfectant* is an agent capable of destroying germs.

An *antiseptic* is a chemical agent which will prevent or retard the growth of germs. In nursing infectious diseases they are in constant use.

Our best disinfectants are :—

I. Heat.

(*a*) *Boiling.*—This is used for surgical instruments, and for crockery or enamelled utensils.

(*b*) *Burning.*—All pieces of linen used to receive discharges from the nose or throat, dirty dressings or swabs from infected wounds, tow or wool used in wiping away discharges from the bowel, and toys or books used by infected persons should be treated in this way.

(*c*) *Dry Heat.*—This method is used for woollen goods such as blankets and clothing. At one time it was used for bedding of all kinds, but it is now known that articles are more completely disinfected by moist heat.

(*d*) *Moist Heat or Steam.*—This is the most usual method. By it all bedding and clothing are disinfected and surgical dressings are sterilized, the latter usually by superheated steam.

II. Chemicals.

Of these the most popular is carbolic acid, or one of its derivatives lysol, cyllin or izal. All bed and body linen sent to the laundry should first be soaked for some hours in a 1 in 20 solution of carbolic acid. In nursing typhoid fever, dysentery, and cholera, the stools and urine are disinfected before being emptied by adding some carbolic lotion to the contents of the bedpan and allowing it to stand for an hour or two to give the disinfectant time to act on the germs. Cyllin or izal may be used in the same way. Lysol (1 drachm to a pint) is useful for swabbing up patients after using a bedpan or for keeping utensils in. Mercury is also employed as a disinfectant and as a solution for the doctors' and nurses' hands. A solution of 1 in 5000 is a reliable antiseptic for this purpose. Perchloride of mercury corrodes instruments and discolours metals which is a drawback to its universal use.

III. Gases.

Sulphur in the form of sulphurous acid gas and formalin are the usual means of disinfecting rooms, which have been occupied by patients with an infectious disease. The sulphur is in the form of a powder or a candle, and the gas is obtained by burning it.

Formalin is a useful and powerful disinfectant. It may be used by boiling a solution and saturating a sheet with it, afterwards hanging up the sheet in the room to be disinfected. It can also be had in the form of tabloids which are placed over a spirit lamp and give off fumes as the heat dissolves them. An Alformant lamp is used. It should be placed in a large pail to prevent fire.

DISINFECTION OF THE PATIENT.

When a patient is declared free from infection he must be disinfected before mixing with other people. A carbolic or lysol bath is given, special attention being given to the hair. The patient is then clothed in perfectly clean garments which have not been in the infected ward or room. The nurse herself should wear a clean overall while she is disinfecting the patient. When a nurse has been in charge of an infectious case, she must take the same precautions in disinfecting herself before proceeding to nurse another. A carbolic bath must be taken, the hair washed, and entirely fresh underclothing and uniform put on.

Disinfection of a Ward or Room.—All infected linen, having been soaked in carbolic lotion (1 in 40), the drawers and cupboards are opened and blankets and clothing thrown over the end of the bed or on a screen. The mattress and pillows may be left in the room during the fumigation and afterwards sent to be disinfected by steam.

The chimney is blocked up and all apertures shut, brown paper being pasted over the openings. In the centre of the room a bucket of water is placed on which an iron shovel or old tray containing the sulphur is placed. One and a half to two pounds of sulphur for every 1000 cubic feet of air in the room is the usual amount. A little methylated spirit is poured on the sulphur and a match applied. As soon as the sulphur is alight, the nurse must leave the room; the door should be locked and the key removed, and the keyhole is then stopped up and paper pasted all round the edges of the door. The room is then left for twelve hours after which it is thoroughly aired by opening all the windows and the register of the grate and leaving them open for twelve hours. The walls are then washed, the floor is scrubbed, and all the furniture is wiped over with some disinfectant. It may be necessary to repaper the room. Any utensils in the room should be boiled and toys and books should be burned.

RULES TO BE OBSERVED BY NURSES WHILE NURSING INFECTIOUS CASES.

Typhoid.

1. All linen used by patient to be placed in a receiver containing carbolic solution (1 in 20). The receiver to be brought to the bedside to receive the linen, then covered and removed to the lavatory. The linen should remain for at least six hours in the solution before being sent to the laundry.

2. All feeding utensils to be kept separately, scalded in boiling water after use and thoroughly boiled when finished with. This applies to all utensils used for any infectious case.

3. *The stools and urine* to be received into a bedpan and urinal containing a quantity of carbolic acid (1 in 20) or perchloride of mercury (1-1000). After use the bedpan is covered with a cloth wrung out of the disinfectant, taken from the room, and sufficient carbolic lotion or perchloride of mercury added to cover the stool. This is left for an hour, so that the germs in the stool or urine are killed, and is then emptied. The drains should be well flushed with disinfectant after emptying such excreta. Any tow or wool used to wipe away discharges should be burnt immediately. This disinfection of the stools is also necessary when nursing cholera or dysentery.

4. *The nurse's hands* also require disinfecting after doing anything for an infectious case. The finger-nails should be kept short and clean. After touching the bed, linen, or any part of a patient with an infectious disease, the hands should be immersed in some disinfectant, biniodide or perchloride of mercury (1 in 1000), then scrubbed well with a nail-brush and soap and water. Special care should be taken to scrub and disinfect the hands well before a meal.

Diphtheria and Scarlet Fever.

1. Always burn any rags or mops used to wipe away discharges from the mouth or nose.

2. Any instruments, such as tongue depressors or forceps, used in swabbing the throat should be placed after use in a bowl containing a disinfectant and *not* laid down on a locker or table.

3. Any scratch or abrasion on the nurse's hands should be carefully covered up.

It is advisable to wear a mask of gauze while examining or applying anything to the throat of a patient suffering from diphtheria or scarlet fever.

4. In diphtheria any membrane coughed up should be burnt, unless required for the doctor's inspection, in which case it should be placed in a test tube containing water, the mouth of the tube being plugged with cotton-wool.

5. During desquamation in scarlet fever the patient should be given a warm bath every day, or the body may be rubbed daily with carbolic oil.

In phthisis or other infectious diseases where sputum is coughed up, some disinfectant must be put in the sputum-cup or the cup may be lined with paper which can be taken out and burned. The cup must be boiled at least once a day.

The body of a patient who dies of any infectious disease should be washed with some disinfectant, such as carbolic lotion. When death is due to small-pox, typhus, or scarlet fever the body is certainly infectious. Besides washing with a disinfectant, the orifices of the body must in these cases be packed with cotton-wool saturated with a solution of mercury or carbolic and the body should be buried with as little delay as possible.

TABLE SHOWING DIFFERENT STAGES OF THE ERUPTIVE AND OTHER FEVERS.

Disease.	Period of Incubation.	Symptoms of Invasion.	Day on which Rash Appears.	Character and Distribution of Rash.	Complications.	Period of Quarantine.	Period of Isolation.
Chicken-pox	17-21 days	Nothing definite	1st	Small spots which develop into vesicles on trunk and face.	Debility	21 days	1 week after crusts have separated
Scarlet Fever	2-5 days	Sudden onset, Headache, Vomiting, Sore throat	2nd	Bright red flush, neck, front of chest, inside of thighs, etc.	Nephritis, Rheumatism. Eye and ear troubles	10 days	6 weeks
Measles	10-14 days	Bad cold in the head, running at the eyes and nose, etc.	4th	Raised spots, blotchy appearance; face first, trunk and limbs after	Pneumonia, Bronchitis, Broncho-Pneumonia Eye & ear troubles	16 days	3 weeks
Small-pox	12-14 days	Sudden onset, Rigors, Vomiting, Pain in back	3rd	"Shotty" pimples at first, then vesicular and pustular; face, neck, wrists then trunk	Laryngitis, Bronchitis, Pneumonia, Eye trouble Abscesses	18 days	1 week after crusts have all separated
Typhoid	14-21 days	Insidious, Lassitude, Headache, Diarrhœa or Constipation	6th to 8th	Rose-coloured spots, come out in crops; abdomen and chest	Hæmorrhage, Perforation, Peritonitis, Pneumonia	21 days	6 weeks. Depends on strength of patient.
Typhus	2-15 days	Sudden, Headache, High temperature, Pain in back and limbs	5th	Dusky red rash, "mulberry"; abdomen, chest, back of hands.	Pneumonia, Inflammation of parotid glands	16 days	1 week after temperature has fallen to normal. 5 weeks from onset.
Diphtheria	2-4 days	Sore throat, General malaise, Vomiting	—	—	Bronchitis, Pneumonia, Paralysis, Heart failure	10 days	3 weeks. Until negative cultures are obtained from throat
Whooping-Cough	5-14 days	Bad cold, Slight fever. Hard dry cough	—	—	Broncho-pneumonia, Convulsions, Wasting	21 days	6 weeks or less if whooping has stopped
Mumps	17-21 days	Swelling of salivary glands	—	—	Swelling of other glands of the body	21 days	26 days

LECTURE VII.

WOUNDS AND THEIR COMPLICATIONS.

Varieties of Wounds—Healing of Wounds—Inflammation—Erysipelas and Cellulitis — Septicæmia — Sapræmia—Pyæmia—Tetanus — Hydrophobia—Frost-bite.

WOUNDS.

A wound is a breach of continuity of the surface of the tissues.

VARIETIES OF WOUNDS.

1. *Incised Wounds* have their edges evenly divided and smoothly cut. There is bleeding and the edges gape. They may be caused accidentally or by the knife of the surgeon.

2. *Lacerated Wounds* have irregular edges and are generally produced by machinery accidents or the tearing and biting of animals. The edges are bruised and there is very little bleeding and no gaping of the wound.

3. *Punctured Wounds.*—In these the depth of the wound is out of proportion to the point of insertion. They are generally caused by the stab of a sharp-pointed instrument. They are often dangerous, as important structures below may be wounded, and bleeding may take place in the depth of the wound.

4. *Contused Wounds* are bruises where the surface of the

skin is not broken, but there is an effusion of blood in the tissues due to laceration beneath the skin. They are caused by direct violence.

5. *Poisoned Wounds* in which some venom or poison is inserted, as in cases of snake bite or insect stings; also applied to infected wounds, e.g. whitlow.

Wounds are also divided into those which are :—

(*a*) *Aseptic*—those which heal without being retarded by bacterial infection.

(*b*) *Septic*—those in which healing is delayed by the action of germs.

HEALING OF WOUNDS.

Wounds heal in two ways.

1. *By first intention.*
2. *By second intention or granulation.*

1. *Repair by first intention* takes place in absolutely clean wounds when the edges are in close apposition and there is no granulation. The blood and lymph join the edges together and healing takes place quickly.

2. *Repair by granulation*, or second intention, takes place when the wound is not clean; the edges gape and are filled up by extravasated blood. Granulations form, filling up the wound, but as the edges gape there is discharge from the wound until the skin has grown over it. A scab is healing by granulation. In small wounds the scab consists of dried blood and lymph and acts as an aseptic dressing under which healing goes on.

When granulating wounds tend to heal from above downwards they are kept open by means of rubber tubing or gauze plugs.

Inflammation is sometimes met with in connection with wounds. It may be due to mechanical or septic causes. Suppuration which is a complication of inflammation is always due to the presence of pyogenic (pus-forming) bacteria.

The *symptoms of inflammation* are *redness*, *heat*, *swelling*, *pain*, *tenderness of the part* and *loss of function*.

In inflammation the blood-vessels dilate so that more blood is flowing in the part and we get the first two symptoms—*redness* and *heat*. As the inflammation increases the blood flows more slowly and may eventually stop and clot. During this time the blood plasma and white cells are creeping through the walls of the vessel producing *swelling* and also *pain* by pressing on the nerves. In parts where swelling is prevented by tense fascia, as in the palm of the hand, the pain is greater. The leucocytes or white blood cells are pouring out into the tissues where they meet the invading bacteria and proceed to devour them. This killing and eating of the disease germs by the blood cells is called *phagocytosis*. In their endeavour to destroy the bacteria, the leucocytes may themselves be killed by the toxins of the bacteria, and with the destroyed tissue cells become liquid and form *pus*—the collection of pus being known as an *abscess*.

Inflammation ends (1) by *resolution* when the tissues return to their normal state ; (2) by *formation of a scar* ; (3) *by suppuration* if it is infected by pus-forming bacteria.

Treatment of Inflammation.—The cause, if possible, should be immediately removed and complete rest given to the inflamed part. The blood supply is arrested by the application of heat or cold, heat in the form of fomentations or poultices, if there is no wound, and cold in the form of ice-bags or evaporating lotions.

Venesection and leeching are also used to diminish congestion.

In chronic inflammation, counter-irritants are employed to give relief. The part may be painted with iodine and in some cases Scott's dressing is firmly applied to the part.

Healing of Wounds.

Incised wounds heal by first intention as a rule if they are clean.

Lacerated wounds take longer to heal. They may heal by first intention but more usually by granulation. They should be well washed and the edges brought together without overlapping. In scalp wounds strapping is useful for this purpose.

Contused wounds are treated by arresting the hæmorrhage which is taking place in the tissues; evaporating lotions such as lead or spirit are used. The bruise shows a change of colour in two or three days due to the gradual absorption of the blood pigment.

Punctured wounds are dangerous because a big artery or vein may be injured or some important organ like the lung or heart may be wounded.

Complications of Wounds.

Erysipelas and Cellulitis.

Erysipelas (St. Anthony's Fire or The Rose) is an acute infectious disease due to a micro-organism (the streptococcus erysipelatis). It is marked by a rapidly spreading inflammation of the skin, accompanied by fever, shivering rigors, vomiting and general malaise.

The incubation period is from three to seven days. If a wound is infected by the organism, the part becomes hot, red, and swollen, and a bright red flush surrounds the wound. The face is affected in the great majority of cases, the flush appearing round the nose and cheeks. The face swells and blebs may form. The inflamed area is raised above the normal skin and the margin is felt as a raised ledge. The glands of the neck are often enlarged.

Nursing.—This consists in complete isolation, as the disease can be carried by direct contact, by fomites and by the air. The patient is kept in bed in a warm room and the eyes shaded from the light. The bowels are kept open by means of saline purges. The diet must be light and nourishing. The inflamed parts may be dusted over with some simple powder, starch or boric acid, and covered with wool fixed by a bandage. Ointment spread on lint and applied to the part is very useful. If for the face a mask must be made. The best ointment is ichthyol 1 part in 10 of vaseline. Gargles are useful if the mouth and throat are affected.

In surgical erysipelas fomentations are sometimes ordered. Cleanliness in every detail must be observed and all dressings should be burned as soon as they are taken off.

The nurse must be careful to have no cracks or cuts on her hands and must never touch her face without disinfecting her hands after touching the patient.

Cellulitis is an acute infective condition due to inflammation of the subcutaneous cellular tissue. Its symptoms are similar to those of erysipelas, the disease being due to a similar organism. It is met with in operation wounds where sepsis has set in, and also in accidental wounds such as compound fractures. Isolation is necessary, and if a wound is infected the stitches are removed, the wound well drained and boracic fomentations applied.

Blood-poisoning is a general term used to describe many septic conditions. It is applied to absorption from a finger which has been poisoned and also to a general blood infection such as septicæmia.

In *Septicæmia* the micro-organisms do not remain in one part as in cellulitis but get into the blood-stream, increase in number and poison all parts of the body. The infection may be carried to the different viscera. Septicæmia after child-birth or a miscarriage is not uncommon.

The pus-forming bacteria may produce many abscesses in different parts of the body. The condition is then called *Pyæmia*.

These two conditions, sometimes classed together as septico-pyæmia, may be a complication of any wound, but they are more liable to occur in people in an enfeebled state of health. The symptoms are rigors followed by sweating, high temperature and small weak pulse with rapid shallow respiration. There may be vomiting and the patient has a sallow look with a hectic flush. There is great prostration and sometimes delirium.

Sapræmia or septic intoxication is a different condition. The blood-poisoning in this case is not due to the bacteria themselves getting into the blood-stream, but is due to the circulation in the blood of poisonous substances (toxins) which are produced by the putrefactive action of the germs upon the dead tissues.

The *symptoms* are a feeling of chilliness with rigors, rapid rise of temperature, and easily compressible pulse. The tongue is dry and covered with a brownish-red fur. Vomiting and diarrhœa are common features.

The *treatment* consists in removing the infective material if possible. The wound is freely opened, and well drained.

Strong lotions are best avoided, but iodoform is useful as it neutralizes the toxins.

The diet must be nourishing, but should consist of foods easily digested. Liquids may be given in large quantities as they are useful for flushing the kidneys. Stimulants are necessary in all severe cases. Brandy or whisky, or hypodermic injections of strychnine, ether, or digitalis are generally ordered.

Tetanus or Lockjaw is another acute infective inflammation, due to an organism called the *Tetanus bacillus.* This bacillus is found in garden earth, dung heaps, and in stable refuse. The infection is caused by the dirt getting into a wound either at the time of the injury or afterwards from want of care.

The *symptoms of tetanus* do not as a rule appear before the fourth or fifth day after the infliction of the wound. Spasms of the muscles of the jaw and neck with stiffness of the mouth, so that there is difficulty in opening it (lockjaw) are some of the earliest signs. This stiffness gradually extends to the other muscles of the face and gives the peculiar mask-like appearance. The angles of the mouth may be retracted, giving the grinning expression known as "risus sardonicus". The other muscles of the body become affected, and, if the muscles of the back are much involved, the body is raised from the bed with each contraction, so that only the heels and head are resting on it. There is in the beginning only moderate fever, the temperature being 100° or 101° F., or it may be normal. Copious sweating is a common symptom and there is generally constipation.

Death is due to exhaustion or heart failure or to asphyxia caused by spasm of the muscles of respiration.

Treatment.—The patient must be kept quite quiet in a darkened room. Any noise or irritation is sufficient to bring on a spasm. Free action of the bowels and kidneys is necessary to get rid of the toxins already absorbed. Injections of saline subcutaneously are sometimes given. Sedatives are ordered in large doses to reduce the spasms, and chloroform is administered to stop the spasms and help in conserving the patient's strength. It is very useful if feeding has to be done by the rectum or the nose. In the later stages if there is hyperpyrexia, tepid sponging may be resorted to. The use of *anti-tetanic serum* in treating this disease is now usual. The sooner it is injected the more hope there is of recovery. The initial dose is about 60 cubic centimetres.

Tetanus sometimes occurs in infants of about a week old. It is due to the umbilical cord being infected by dirty dressings. It is almost always fatal.

Hydrophobia, is an acute infective disease following on the bite of a rabid animal, generally a dog or cat. The poison is carried by the saliva of the animal.

The *incubation* period is long; it may be a few weeks to seven or eight months.

The onset is marked by a feeling of general malaise with chills. This is followed by difficulty in swallowing and a sudden catch in the breathing accompanied by a loud hiccough, popularly likened to the barking of a dog. There is a copious secretion of saliva which runs out of the mouth. The thought of drinking or the sound of running water aggravates the spasms. The temperature is raised and the pulse is rapid and small. Death is generally due to paralysis and frequently occurs in a spasm by the respiratory organs becoming fixed.

Treatment.—After the bite, the wound is cauterized by means of a cautery or by the application of pure carbolic acid, and is then dressed with antiseptic dressings. The Pasteur treatment, by which a toxin got from the spinal cord of rabbits inoculated with the poison of rabies is injected into the person bitten by the rabid animal, is useful as a preventative, but does not cure.

The patient must be kept quiet and free from any irritation. There is generally difficulty in feeding and food and stimulants may have to be given per rectum. The spasms are relieved by means of sedatives or inhalations of chloroform.

Frost-bite, though not a complication of a wound, may be taken in this lecture in connection with inflammation. It is an inflammation due to great cold, not to sepsis. The condition usually shows itself when the parts which have been subjected to extreme cold are brought into warm surroundings. It generally affects the toes, fingers, ears and nose. There is numbness in the part, followed by a sense of weight and tingling and loss of sensation. It may end in gangrene, if warmth is applied too quickly.

Treatment.—The circulation of the part must be restored by friction. The too sudden application of heat must be avoided. The patient must not be taken into a warm room at once, but should have the part rubbed with snow or put in a cold bath and friction applied till the blood begins to circulate. A warmer atmosphere is then permissible but direct heat is not required. The part may be wrapped in cotton-wool and kept elevated. Stimulants and hot drinks are given if there is much shock. If gangrene supervenes it may be necessary to amputate the finger or toe.

LECTURE VIII.

Burns and Scalds—Degrees of Burns—Treatment of Burns—Complications of Burns—Ulcers—Classes of Ulcers—Common Forms of Ulcers—Treatment of Ulcers.

BURNS AND SCALDS.

Burns, are produced by the action of dry heat as by the flame of a fire; *Scalds* occur from the action of moist heat, generally in the form of hot fluids or steam.

DEGREES OF BURNS.

Burns are divided into *six* degrees according to their severity.

First degree—a scorching or reddening of the surface of the skin.

Second degree—when blisters have formed.

Third degree—when the whole of the upper part of the skin is destroyed.

Fourth degree—when the whole thickness of the skin is destroyed.

Fifth degree—Destruction down to the muscles.

Sixth degree—Destruction of the soft parts down to the bone.

Symptoms of Burning or Scalding.

Pain and congestion are the two symptoms first met with. If the burn is at all extensive the symptoms of shock may be present. The actual danger to life depends on the extent and depth of the burn and the part of the body affected. If one half or one third of the body is involved the chance of recovery is slight. If the burn is on the surface of the chest and abdomen the condition is very serious. Children succumb very readily to burns as there is much shock.

The *history* of a severe burn is divided into three periods.

The first period lasts for from thirty-six to forty-eight hours. During this time the patient is in a state of shock and suffers no pain. If shock is not present there may be much suffering.

The second period lasts from the time the condition of shock passes off till the sloughs have separated. The period is characterized by high temperature 103° or 104° F.; and there may be inflammation of some of the internal organs, bronchitis if the chest is burned, meningitis if the head is affected. Albuminuria is a common complication of severe burns.

The third period begins when the sloughs have separated (from the seventh to the fourteenth day) and continues till the wound heals. If death occurs during this period it is generally due to septic absorption and sometimes to hæmorrhage.

Treatment.—The condition of shock must be treated first. The patient should be placed, without any undressing, in bed between hot blankets and have hot water bottles round him. The end of the bed is raised on blocks, and the patient is placed in the recumbent position. If necessary the bed or cot may be drawn up near the fire. Brandy is generally given at this stage in the form of hot drinks. Opium in some form is usually ordered for the relief of pain. The *local treatment* is carried out as soon as the shock has passed off. The treatment is as follows:—

1. *Remove the Clothes.*—This must be done with the greatest care and gentleness, the garments being cut off, not dragged or pulled. If any part is adhering closely it can be soaked off with a solution of bicarbonate of soda. If the leg is burnt and there is difficulty in removing the stocking, soak it with olive oil. In extensive burns in children, the child can be placed in a warm boracic bath and the clothing soaked off. The bath is also useful as a restorative.

2. *Apply Dressings.*—In first-aid treatment where surgical appliances are not at hand, any simple oil or ointment may be used as a dressing. In hospital practice, after the clothes have been removed, the part is thoroughly cleansed with some mild antiseptic such as boracic or biniodide of mercury, followed by saline solution. The blisters are opened with a pair of sterilized scissors and the serum allowed to escape. A general anæsthetic is sometimes given to the patient for this cleansing process if the burn is severe; and if the patient is a child the after-dressings are done under anæsthesia. When the burned area has been thoroughly cleaned, it is dressed like an ordinary wound, the nurse taking every precaution to ensure asepsis. Antiseptics have to be used with caution, as there is always the chance of absorption through the raw surface. For superficial burns, a solution of picric acid (1½ drachms of the acid to 2 pints of hot sterile water) is a useful dressing. It is also used in the first place for burns of more severity. Pieces of lint or gauze are soaked in the solution, spread over the part, covered with sterilized wool and bandaged. If the injured part is a limb, a splint is

applied after dressing to keep the part at rest. The picric dressing requires changing twice a week. Absolute alcohol is now very much used in place of picric acid. The blisters are snipped and the dead skin removed and sterile gauze wrung out of absolute alcohol is then applied to the part and changed every two hours. The application is rather painful but the results are excellent. When the parts are quite clean, aristol powder, dusted on, hastens the process of healing.

When the burn is very septic, boracic fomentations are used to loosen the sloughs. After the sloughs have been removed and the part is healing the wound is dressed with perforated oiled silk which has been sterilized, over which layers of gauze and wool are placed and secured with a bandage. The dressing is changed every second or third day. If the burns have destroyed the soft parts down to the muscles or bones in a limb amputation is necessary.

In very extensive burns when the trunk is affected, a continuous boracic bath may be ordered. The water must be maintained at a temperature of from 98° F. to 100° F. and changed frequently.

The process of healing in large burns is sometimes hastened by *skin-grafting*. Rapid healing and skin-grafting are means for preventing contraction from burns. For skin-grafting, strips of skin are removed from another part of the body by means of a razor or Thiersch's skin-grafting knife. These are placed on the granulating surface, take root and form new skin. Strong antiseptics should not be used in skin-grafting as they kill the grafts. Saline solution at a temperature of 105° is used and should be in readiness.

COMPLICATIONS OF BURNS.

At the end of the first stage vomiting and diarrhœa often occur. Albuminuria is a common complication. In the second stage, pneumonia and bronchitis are common and often prove fatal. Hæmorrhage may occur from an artery or vein in the area of the burn when the sloughs separate. A few cases have been met with where there was ulceration of the duodenum with subsequent perforation. In the late stages death is often due to blood-poisoning or exhaustion. Rashes are sometimes seen after burns due to the absorption of toxins and in children suffering from burns an attack of scarlet fever is not uncommon. A rash in cases of burns should always be reported and the case isolated till seen by a medical man.

SCALDING OF THE THROAT.

This is a not uncommon accident with young children, due to the child drinking from the spout of a boiling kettle or inhaling the steam. The scald produces great swelling of the larynx, which if not relieved may result in death.

Treatment.—This consists in giving teaspoonful doses of olive oil frequently to soothe the injured membrane. Hot compresses should be applied to the throat, and the child placed in a steam tent. If the symptoms are not relieved by these methods the operation of tracheotomy may have to be performed.

ULCERS.

Ulceration is defined as suppuration occurring on a free surface, either skin or mucous membrane. An ulcer may be described as a sore which has no tendency to heal.

Classes of Ulcers.

1. Those due to some injury, e.g. the varicose ulcer.

2. Those caused by some infective disease, e.g. the tuberculous or syphilitic ulcer.

3. Malignant ulcers, e.g. the rodent.

The more common kinds of chronic ulcer are:—

1. *The Weak Ulcer.*—When ointment dressings or fomentations have been used too long on a wound the granulations become pale and very exuberant and the vessels bleed readily. This is called a weak ulcer and the flabby raised granulations are known as "proud flesh".

2. The *Callous Ulcer*, is seen most frequently on the legs of women in middle life. The edges are hard and raised, the surface smooth and glistening with ill-formed granulations. The discharge is serous or purulent and there may be pain from pressure on nerves.

3. *The Varicose Ulcer* occurs in patients with varicose veins. It is usually situated in the lower third of the leg. The skin over the veins becomes of a mahogany brown or bluish colour if the varicose veins are of long standing. Any injury or abrasion may produce a varicose ulcer. The ulcer is sometimes due to irritation or friction.

4. The *Irritable Ulcer*, is generally found in the neighbourhood of the ankle. Its chief characteristic is the pain which accompanies it. This is of a burning or shooting character and is generally worse at night.

Treatment of Ulcers.—Each kind of ulcer requires its proper local treatment, but there are certain principles which help us in the general management of these sores. The part must be kept at rest, and if the leg is the part affected, the patient should be kept in bed with the limb raised on a pillow. Cleanliness is essential. The surface of the ulcer and the surrounding skin must be kept clean before there is any hope of the part healing. The patient's general health must be attended to and a nourishing diet provided.

If the healing ulcer is in a healthy condition no special treatment is necessary. Granulations form and are gradually covered with epithelium. If the surface of the ulcer is very large skin-grafting is frequently resorted to to hasten the process of healing.

The callous ulcer, sometimes called "indolent," requires much care to be successfully treated. Thorough cleansing is the first part of the treatment. Boracic fomentations are applied, or if the wound is very foul a charcoal poultice may be useful and the boracic fomentations continued afterwards. Pressure is also used in the treatment, an ordinary bandage being applied from the toes up to the knee or Martin's india-rubber bandage may be used if the veins are enlarged. When the part is clean, an ointment dressing or, if the ulcer requires a little stimulation, a dressing of red lotion is applied. If the granulations are forming too quickly they may be touched with nitrate of silver.

When equable pressure is required, as in varicose ulcer of the leg, a method suggested by Professor Unna of Hamburg is used. It is called *Unna's bandage* and is made up of gelatin, glycerine, boric acid, oxide of zinc and water rubbed into a gauze bandage. The skin of the limb is thoroughly washed and disinfected. The ulcer is purified and powdered with boracic or iodoform powder. A sterile bandage of gauze is then wrapped round the limb, commencing at the middle of the sore and going first above then below. Unna's paste, being melted by placing the vessel containing it in a saucepan of boiling water, is painted on or rubbed into the bandage ; a second bandage is put on in the same way and coated with the mixture. These are allowed to dry and form a firm support to the leg without being heavy. If the ulcer is discharging and requires dressing, a window may be left in the plaster over the sore.

When varicose veins are present, operative treatment or some support like Unna's bandage must be tried before the ulcer is likely to heal.

The "irritable ulcer" may be treated with soothing remedies such as lead and opium lotions or boracic fomentations. In bad cases the surgeon may destroy the nerve endings under an anæsthetic.

LECTURE IX.

Poisoning and other Emergencies—Poisons—Classes of Poisons—Symptoms of Poisoning—Treatment of the More Common Cases of Poisoning—Sunstroke—Asphyxia and Drowning—Treatment of Suffocation from Hanging—Treatment of Suffocation from Poisonous Gases.

POISONS.

A POISON is a substance which, having been administered in any method either externally or internally, may cause death to a person or injure his health apart from mechanical action.

Poisons may be taken by accident or a patient may be poisoned by overdosing with some drug.

Poisons may be administered :—

1. *By mouth*, e.g. anything poisonous that may be swallowed.

2. *By the respiratory tract*, e.g. chloroform—poisonous gases.

3. *By hypodermic injection*, e.g. morphia.

4. *By absorption from a mucous surface*, e.g. morphia in the form of a suppository in the rectum.

5. *By absorption through the skin*, e.g. carbolic acid or mercury used in dressings.

6. *By absorption from a serous surface*, e.g. carbolic acid used in washing out the pleural cavity.

Poisons are divided into *two* Classes.

I. *Neurotic Poisons.*

II. *Irritant Poisons.*

I. *Neurotic poisons* act on the nervous system.

1. By acting on the brain and depressing the system—called *Narcotic poisons* (e.g. Opium).

2. By acting more directly on the spinal cord and exciting the system—called *Convulsant poisons* (e.g. Strychnine).

II. *Irritant Poisons* are divided into *three* kinds.

1. *Acids*, e.g. sulphuric acid—oxalic acid.
2. *Alkalies*, e.g. lime—ammonia.
3. *Irritants proper*, e.g. arsenic—phosphorus—mercury.

In treating cases of poisoning certain principles are followed. They are:—

(1) *To remove the poison* from the stomach before it is wholly absorbed, by means of emetics or the stomach tube.

(2) *To counteract the poison* already absorbed by administering an antidote, i.e., a drug which will prevent the poison from acting as a poison by rendering it insoluble or converting it into a harmless compound.

(3) *To support the patient* by warmth and if necessary by stimulants.

In cases of poisoning by corrosive substances such as acids and alkalies, the nurse must remember that no emetic should be given and the stomach tube must not be used, as there is the danger of perforating the burned tissues of the œsophagus and stomach. In such cases some demulcent drink, such as milk, raw eggs beaten in milk, gruel, and olive or sweet oil is given to sooth the charred tissues. An antidote is then administered to neutralize the action of the poison. An alkali is an antidote to an acid and vice versa, so that if we have a case of poisoning by an acid such as hydrochloric we would give the patient lime-water, chalk and water, plaster from the walls, or washing soda in water to drink. If the poison is an alkali, such as caustic potash, an acid antidote must be given, e.g. vinegar or lemon juice.

It is safe to give emetics in most cases of poisoning unless the lips, mouth, and throat are charred as in cases of corrosive poisoning.

The *emetics* in common use are

1. *Mustard*, a tablespoonful in a tumblerful of warm water.
2. *Salt*, 2 tablespoonfuls in a tumblerful of warm water.
3. *Zinc sulphate*, 30 grains in a tumblerful of warm water.
4. *Sulphate of copper*, 10 grains in a tumblerful of warm water.
5. *Ipecacuanha wine*, 1 drachm every ten minutes till vomiting occurs for an adult; 15 minims for a child.
6. An emetic given by hypodermic injection to produce vomiting quickly is *apomorphine ;* but this is only given if ordered by the doctor. The dose is $\frac{1}{20}$-$\frac{1}{10}$ grain by hypodermic injection.

POISONS AND THEIR TREATMENT.

Strychnine.

Strychnine, the active principle of Nux Vomica, is a valuable cardiac stimulant given in the form of mixtures or hypodermically. It is a convulsant poison. The dose is $\frac{1}{60}$-$\frac{1}{15}$ grain. All medicines containing strychnine should be well shaken as the strychnine is apt to crystallize.

Signs of poisoning are :—Twitching of the muscles which may increase so as to resemble the convulsions of tetanus, eyes are open and staring, face purple, respirations rapid and laboured, the intellect clear.

Treatment.—Give emetics, keep the patient from harming himself during the convulsive movements.

Artificial respiration may have to be performed, and chloroform may be given to inhale to reduce the spasms, but only by the doctor's orders.

Opium.

Opium, or one of its derivatives—morphia, codeine, laudanum, or paregoric—is a common cause of poisoning. Chlorodyne and nepenthe contain opium, as also do many soothing syrups given to children. Children bear opiates very badly. The dose of tincture of opium is from 5 to 30 minims. The injection hypodermically of morphine is 2 to 5 minims ($\frac{1}{8}$-$\frac{1}{2}$ grain). Opium is the most common example of a narcotic poison.

Symptoms of Poisoning. — Excitability succeeded by drowsiness and coma; *pupils of the eyes contracted*, known as "pin-hole pupils"; slow, weak pulse and stertorous breathing.

Treatment.—Give an emetic at once. The stomach may be washed out with a solution of permanganate of potash. Keep the patient from going to sleep by walking him about between attendants and flicking him with wet towels. Hot strong coffee to be given by mouth or if necessary by rectum. The doctor may give atropine hypodermically as it is an antagonistic drug.

Belladonna.

Belladonna, or its active principle, Atropine, is a drug in frequent use. It is given to relieve pain or to check the flow of milk in a nursing mother. It is a narcotic poison. The dose of tincture of belladonna is 5 to 15 minims. The hypodermic injection of atropine is from $\frac{1}{200}$ of a grain to $\frac{1}{100}$. Children take belladonna well and it is often ordered to check nocturnal incontinence.

Symptoms of Poisoning.—Dryness of the mouth, all the secretions are checked; *pupils of the eye dilated*, quick pulse, dimness of vision; a scarlet rash may appear.

Treatment.—Give an emetic or wash out the stomach. Apply heat externally. Artificial respiration may be necessary. Hot and cold affusions to the head. Morphia may be ordered to be given hypodermically as it is the antagonistic drug.

Chloral Hydrate.

Chloral Hydrate (dose 5-20 grains) is a pure hypnotic. It produces sleep but has no power over pain. Similar drugs are veronal, trional and sulphonal.

Symptoms of Poisoning.—Slow, feeble pulse, slow respirations; face is at first flushed, then pale and cyanosed. There may be convulsions or deep unconsciousness. The extremities are cold.

Treatment.—If it is a case of overdosing, the drug will be stopped; if of poisoning, an emetic is given or the stomach-tube used. External heat is applied and mustard foot-baths or mustard plasters as counter-irritants; strychnine or alcohol given as stimulants or strong coffee by rectum. Artificial respiration may have to be resorted to.

Mercury.

Mercury (Hydrargyrum) is given in many forms in nursing. The most common are—

(*a*) Mercurial lotions, perchloride or biniodide of mercury.

(*b*) Calomel or grey powder as a purgative.

(*c*) Mercurial ointment for inunction. As a poison mercury comes under the head of irritants proper.

Symptoms of Poisoning.—The chief signs are soreness of the gums, metallic taste in the mouth, increased salivation and the gums become swollen and spongy while the teeth loosen.

Treatment.—Stop the drug or the use of mercurial solutions, dressings or ointment. If mercury has been taken as a poison, white of egg alone or in milk should be given. Flour in water is also useful.

Carbolic Acid (*Phenol*).

This is a poison frequently taken by accident or the poisoning may be caused by absorption. Children have been known to develop symptoms of carbolic poisoning after an application of a carbolic compress. Carbolic is a corrosive acid poison.

Symptoms of Poisoning.—The mucous surface of the mouth is whitened by the acid; there is pain in the throat and stomach. The urine becomes dark and greenish-black in colour—*carboluria.* Faintness and giddiness with collapse are met with in extreme cases and the patient is apt to become comatose.

Treatment.—Give lime water or milk and white of egg. The stomach tube may be used and oil or melted butter poured down to protect the burnt surface of the stomach. A purgative, such as Epsom or Glauber's salts is given to neutralize the poison. External heat and stimulants are indicated.

Iodine.

Iodine may be taken by accident in the form of a liniment or lotion; or the symptoms may be produced by absorption after use of iodoform in surgical dressings. Iodine is an irritant proper.

Symptoms of poisoning are catarrh of the eyes and nose, headache, rise of temperature and restlessness. There may be a bright red rash on the face and limbs.

Treatment.—Give an emetic, then white of egg or starch boiled with water. Arrowroot may also be given.

Phosphorus.

Phosphorus may be taken in the form of rat-paste, or cases of poisoning in children have been due to the sucking of the heads of matches.

Symptoms of Poisoning.—Vomiting, burning pain in the throat and stomach, and intense thirst.

Treatment.—Give an emetic or wash out the stomach if the poison has been recently taken.

N.B.—No oil should be given in phosphorus poisoning as phosphorus quickly dissolves in oil and this would hasten its absorption.

Lead.

Lead is a drug which if given for a lengthened period may produce symptoms of poisoning—plumbism. Poisoning is also caused by workers in white lead factories swallowing the dust.

Symptoms of poisoning are vomiting and abdominal pain; the gums have a blue line above the teeth and the breath is offensive; there may be numbness of the body. Stiff joints and wrist-drop are sometimes present.

Treatment.—The stomach tube or emetics are used to get rid of the poison. White of egg or milk and Epsom salts are given afterwards.

Arsenic.

This is a drug very much used in the treatment of disease, especially in cases of anæmia, chorea and certain skin diseases. In the treatment of syphilis it is used in the form of *salvarsan.* In trade it is sold in the form of a weed-killer, sheep-dip and fly-papers, and is a frequent cause of poisoning.

Symptoms of Poisoning.—These are vomiting, nausca, abdominal pain, severe diarrhœa and cramp. The pulse may be very feeble and the respirations rapid. In bad cases there is collapse.

Treatment.—In cases of accidental arsenic poisoning emetics are given or the stomach is emptied by means of the stomach tube. The antidote used is perchloride of iron (steel drops) mixed with washing or cooking soda. This renders the arsenic insoluble and harmless. Doses of castor oil or magnesium sulphate should be given to empty the bowel. The collapse is treated in the usual way.

Prussic Acid.

This is a common and powerful poison. It is also known as hydrocyanic acid.

Symptoms of Poisoning.—The patient becomes quickly insensible; the eyes are staring and the pupils dilated. The respirations are slow and irregular and the pulse feeble. There may be convulsions resembling those of epilepsy.

Treatment.—Emetics may be given. Cold water poured over the head and back is an easy way of restoring the respiratory functions. Ammonia may be given to inhale and artificial respiration resorted to if the insensibility is deep.

Ptomaine Poisoning.

Ptomaine poisoning is generally caused by foods which are unsound, such as meat, shell-fish and pies.

Symptoms of Poisoning.—Vomiting with purging and great pain in the stomach are the first signs. Cramp in the limbs, and, in extreme cases, great weakness and collapse are also found.

Treatment.—Give an emetic, followed by a dose of castor oil. Keep the patient warm and give hot drinks of tea or coffee.

Acute Alcoholic Poisoning.

When a large quantity of alcohol has been taken, the drinker is at first excited and then passes into a condition of unconsciousness. The face is flushed and congested, the breathing stertorous and the pupils may be dilated or contracted. The pulse is feeble. Apoplexy has frequently been mistaken for alcoholic intoxication as the symptoms are somewhat similar. The alcoholic odour of the breath, the fact that the patient can be roused and that the pupils of the eyes are generally evenly dilated are the chief means of distinguishing between apoplexy and alcoholic intoxication.

Treatment.—Administer an emetic and apply warmth to the patient. When he becomes conscious hot drinks of tea or coffee may be given. A mustard plaster is sometimes applied to the nape of the neck.

SUNSTROKE.

This is a condition induced by prolonged exposure to the sun's rays. Heat-stroke or heat exhaustion is more common in the stokeholds on board ship. The stokers are overcome by the intense heat, especially if the ship is in the tropics.

Symptoms.—In sunstroke the patient is unconscious, the face is flushed, the breathing deep and laboured and the temperature is very high, from 107° to 110° F.

Treatment.—The high temperature must first be reduced. If admitted into hospital, immersion in a cold bath is tried. Iced compresses to the head or the administration of iced water enemata are also useful. If the patient is outside, remove him to the shade, and remove the clothing from the upper part of the body. Cold water should then be poured over his head and spine, and ice may be given him to suck.

ASPHYXIA AND DROWNING.

Artificial respiration has to be resorted to in cases where a patient has stopped breathing. It is necessary in some forms of poisoning, in cases of drowning, in cases of asphyxia from inhalation of some gas or from an anæsthetic, in attempted hanging, and after electric shock.

Sylvester's Method of Artificial Respiration.

Of the many methods such as Marshall Hall's, Schäfer's, Howards's, Labordes', etc., this is the one most commonly used. The patient is laid on his back with a pillow below the shoulderblades. All tight clothing is loosened, the tongue is pulled forward and a piece of tape, elastic band or a tongue forceps used to keep it from falling back into the mouth. Any water or foreign substance is cleared out of the mouth and throat by means of a handkerchief wrapped round the finger. The operator then stands or kneels at the patient's head, and flexing the elbows of the patient grasps the tip of each elbow with his hands and brings the arms up over the patient's head until his hands meet behind. In this way the cavity of the chest is expanded as in respiration. The arms are held there for two seconds and are then carried back and pressed against the sides of the chest, squeezing them against the ribs in order to expel the air, counting one, two, before repeating the process. These movements are repeated at the rate of from fifteen to eighteen times a minute to correspond with the natural respiration rate. The length of time before all hope is abandoned cannot be decided, but even after several hours of suspended animation, cases are on record where it has been possible to restore breathing. When there are signs of recovery, the next thing to do is to promote the circulation by applying friction and warmth to the body. The patient should be placed in hot blankets and the limbs rubbed from below upwards. Hot bottles and hot drinks are necessary.

In Attempted Hanging or Strangulation.

Remove the cord or scarf and undo any tight clothing. Allow a free current of air to pass over the patient, and clear out any accumulation of mucus in the throat. Perform artificial respiration.

In Suffocation by Poisonous Gases.

Remove the patient to the open air and loosen all tight clothing. Dash cold water on the upper part of the body and perform artificial respiration.

LECTURE X.

Preparation of Patient for Operation—General Preparation of Patient—Preparation of Area of Operation—After-treatment of Operation Cases.

PREPARATION OF A PATIENT FOR OPERATION.

1. *Preparation of the Patient.*—It is advisable to keep a patient in bed for a day or two before operation. This gives the nurse time to know the patient and to make observations. It has the advantage of accustoming the patient to restraint and of teaching the use of the bedpan and other necessities. During these two days the bowels are regulated by aperients, the urine is examined, and a daily temperature chart is kept.

The *night before the operation* the nurse must attend to the personal cleanliness of the patient. A hot bath is given, using plenty of soap, special care being taken to clean parts of the body often neglected, the umbilicus, folds of the groin, axillæ and ears. The nails should be cut and trimmed, and if necessary the hair washed. A bath in bed will be required if the patient is too ill to go to the bathroom.

A dose of castor oil, ½ oz. to 1 oz., is given in the afternoon or evening of the day before the operation and a large soap and water enema in the morning. That night the patient may have the usual meal, slightly reduced in quantity.

On the day of operation, the teeth should be carefully cleaned and any false ones removed and placed in a glass of water in the locker or other safe place. The patient should never be allowed to leave the ward with false teeth, as in the flurry of the anæsthetizing room their removal is sometimes forgotten. The hair, if the patient is a woman, is arranged in two plaits or is coiled on the top of the head. In operations in the region of the head, the hair should be covered by sterilized towels, and for tonsils and adenoids a rubber bathing-cap is useful.

The *clothing of the patient* requires thought and should be arranged so that the required area of the body can be got at without undue disturbance. A nightdress or shirt opening down the back covered by a theatre gown of flannel or a dressing-gown, put on back to front, so that it can easily be removed when the patient is on the table, should be worn. Long woollen stockings should cover the legs reaching well up the thighs. For operations on the abdomen, the chest may be covered with a pneumonia jacket for additional warmth. A blanket folded cross-wise or a sterilized sheet is tucked all round the patient before he is moved to the theatre. If there is a long distance to go a small blanket or shawl may be thrown round the head and neck. Very young babies are sometimes wrapped in sterilized wool loosely bandaged on, the area of operation being left free. The nurse, who takes the case to the theatre, takes with her as a rule the patient's bed-card, in case the history has to be referred to, also a porringer and soft towel in readiness for the return journey when there may be vomiting. The nurse must see that the garments are unfastened at the neck before the anæsthetic is given.

The bladder should be emptied just before the patient goes to the anæsthetizing room. If there is any doubt as to urine having been passed, the bladder may be emptied by a catheter. Most surgeons like a catheter passed before any abdominal operation. Douches are given in preparation for vaginal operations.

The *last meal before operation* should be given at least five hours before the hour fixed. Beef-tea, chicken-tea, mutton broth or bovril is usually given in any quantity up to 8 ozs. Stimulants are sometimes given, but only by special order of the doctor.

The nurse should always endeavour to send her patient to the operating theatre in a cheerful and hopeful frame of mind. Much can be done by a nurse to reassure a patient, who is naturally nervous at facing such an ordeal.

2. *Preparation of the Area of Operation.*—The skin in the region of the operation must be purified. The part of the body to be operated on is prepared by mechanical disinfection and by antiseptics. Several methods are used. This preparation is begun as soon as the hot bath has been given. Any hair in the vicinity of the operation area is shaved; the scalp must be shaved wholly or in part for different operations on the head; the limbs should be shaved if they are at all hairy when they are the seat of operation. In abdominal operations, the pubes requires shaving and in vaginal operations the vulva must be included. For breast operations it is necessary to shave the axilla.

After shaving, the part is well washed with soap and water, a washing glove being used in treating tender parts in preference to a nail-brush which is rather rough. This washing having been done, *one method of preparing* the site is to remove the fatty matter on the surface of the skin by washing it over with ether and afterwards with some antiseptic, such as biniodide of mercury, 1 in 2000. The part is then covered with sterilized gauze or lint wrung out of biniodide lotion, over which is placed a piece of jaconet or gutta-percha tissue. This dressing is fixed by a bandage very securely so that it cannot slip.

Another method is, after the hot bath on the night before operation, to wash the skin area well and to place a dry dressing of lint over the part. On the morning of operation this area is painted with tincture of iodine and covered with a piece of lint. The application of iodine is renewed on the operating-table before operation. The skin must be quite dry before the iodine is applied, otherwise it will not soak in.

Special preparations are required for certain parts of the body. In operations on the ear, such as for mastoid disease, the ear cavity must be syringed beforehand and packed with a little sterilized ribbon gauze. For mouth operations gargles and mouth-washes should be given frequently and the teeth be specially cared for. In rectal cases it is necessary to see that the bowel is thoroughly cleaned out by means of frequent enemata, and that the enemata are entirely returned.

After-treatment of Operation Cases.

As soon as the patient has been taken to the operating theatre the bed should be prepared for his return. The mattress is turned and the bed made up with clean sheets, a mackintosh and draw-sheet being used. The pillows are removed so that the head is low and all the bedclothes are rolled to the foot of the bed. Two or three hot-water bottles are then placed in the bed and covered with a folded blanket. A blanket should be placed near the fire to get warm as there may be some shock to combat. The temperature of the ward should be 60° F.

The patient should not be left alone after his return to the ward until he has recovered consciousness. If there is *vomiting* the head must be turned towards one side so that the vomit will run out at the corner of the mouth into a bowl placed in position under the mouth. If there is an abdominal wound the nurse must place her hand firmly over it while the patient is retching to protect it from the strain. During vomiting the patient's lower jaw is pushed forward by placing the thumb behind the angle of the jaw. This carries the tongue forward and prevents it falling into the back of the throat. If the patient is cyanosed and breathes badly it may be necessary to open the mouth with a spatula or mouth gag and to clear away the vomit with the finger or with a swab fixed on a sponge-holder. The patient may be *restless* and inclined to throw off the bedclothes. This must be prevented. If the patient is lying in the dorsal position a pillow may be placed below the knees to take the strain off the abdominal muscles. Sometimes the bedclothes cause the restlessness and a cradle to remove the weight of them is of use.

When the patient wakens up from the anæsthetic, *thirst*, *sickness*, and *pain* are generally complained of. The thirst is relieved by washing out the mouth with warm water. In abdominal cases saline injections by rectum are given to relieve this symptom and some surgeons allow the patient to have plenty of water by mouth, even if it is vomited, as it helps to wash out the stomach. The *vomiting* generally stops in a few hours, but, if it persists, a drink of warm water with a pinch of bi-carbonate of soda in it may be ordered and is helpful. It is immediately returned from the stomach and removes with it the traces of the anæsthetic.

The *pain* varies with the nature of the operation. If only slight the patient must be encouraged to bear it. It is sometimes due to the tightness of the bandage. The nurse may loosen this a little if she does not interfere with the dressing. Change of position may give relief, but the moving must be done by the nurse, the patient using no exertion. In nursing patients after operations on the abdomen especially where there is septic peritonitis, *Fowler's position* is used. After the patient has recovered consciousness he is placed in a sitting-up position by means of a bed rest. To prevent him from slipping down, a pillow, to which straps of webbing or bandages are fastened at each side, the other ends being fixed to the head of the bed, is placed below his knees. Some surgeons use this position for all cases of abdominal section. About eighteen hours after operation, if the patient is not very anæmic or suffering from shock, he is placed in this position and finds it very comfortable. There is less backache, sickness, and flatulency, and the patient is stronger when the time comes for him to get up.

It is usual to remove the flannel gown and woollen stockings when the patient has recovered from the condition of shock. One or two of the hot-water bottles are also removed if they prove uncomfortable. When consciousness is regained the pillow may be placed in position at the head. The pain in the back frequently complained of may be relieved by placing a small pillow or a roll of something soft in the hollow of the back.

The outside of the dressing must be looked at frequently to see if there is any sign of *bleeding or discharge.* If there is any discharge the surface of the bandage should be swabbed over with some carbolic lotion, 1 in 20, packed with sterilized wool and fixed with another bandage. A dressing which has to be packed should always be reported, as it may necessitate the wound being redressed next day. On the eighth day the wound is generally dressed and the stitches removed, if there has been no discharge.

There may be difficulty in passing *urine.* This is especially so in abdominal operations on women. The catheter may have to be passed if at the end of ten hours after operation the patient has been unable to pass urine naturally. This, however, should be the last resource. Propping the patient up a little, applying hot flannels over the bladder or placing a little hot water in the bedpan are methods that may be used and are often efficacious. A nurse in reporting must always state whether an operation case has passed urine within ten hours of the operation.

An *aperient* is generally given on the evening of the day following the operation, and, if necessary, an enema may be administered on the following morning.

The temperature, pulse and respiration must be taken every four hours and charted. If there is a rise of temperature on the second or third day the nurse must watch for symptoms of sepsis or some chest complication.

The *feeding* varies with the operation and the age of the patient. If there is no sickness after three or four hours in ordinary cases a little milk diluted with water may be given. In abdominal cases no milk should be given till eight hours after operation. After the bowels have acted on the third day solid food may be given.

Reactionary hæmorrhage must be watched for. In amputations of a limb the bedclothes should be arranged so that the stump can be seen easily and any bleeding at once observed. A tourniquet should always be kept at hand if there is an amputation case in the ward. In cases of amputation of the breast this form of hæmorrhage has also to be watched for. The arm of a case of amputation of breast may be massaged after the second day to prevent it becoming stiff. In an abdominal operation such hæmorrhage is *internal* so that the nurse will only be able to recognize it by the symptoms. These signs have already been described under *Hæmorrhage*. No stimulants should be given, but the surgeon should be sent for. The end of the bed should be raised and the patient kept quiet. The wound will be reopened and the bleeding point found and ligatured.

Sepsis is a complication which may arise. The signs may be local or general. The local sign is an unhealthy wound. There is redness and swelling and some of the sutures may give, the pus welling up between them. As a rule a wound of this kind is treated with fomentations, changed every four hours. The general signs of sepsis are rise of temperature which may be ushered in by a rigor; the temperature may be anything from 100° to 105°. The pulse rate is high, 120 to 130. There is generally vomiting and there may be pain and throbbing in the wound. If the case is an abdominal one there is distension, and in some cases no flatus is passed.

In *emergency* cases, the preparation of the patient may be left till he is on the operating table as the preparation of the part and the giving of an enema often increase the shock which is already present. If the case is not very urgent, the skin of the part may be prepared, but care must be taken if it is a case of appendix abscess that the abdomen is not rubbed too hard, as any such treatment may rupture the abscess.

Emergency cases should be kept warm on the operating table by placing hot bottles round them. A water pillow filled with hot water is best used in the case of a child.

The nurse should make all preparations for the treatment of shock before the patient's return from the theatre. Hot saline should be in readiness with all the apparatus for administering it subcutaneously or by rectum. The foot of the bed should be raised on blocks if the shock is severe.

After *operations on children*, it is necessary to keep the child lying down. This is done by means of shoulder straps, through which webbing is placed and fixed round the bed, fastening with a buckle below. The legs are kept at rest by a piece of bandage passed round each ankle and secured by a clove-hitch, and the ends attached to the cot itself, not to the sides which are movable.

A child can generally be fed very shortly after operation, except in abdominal cases or cases of cleft palate, as they do not suffer so much from the after-effects of the anæsthetic. After emergency operations on children it is very necessary to feed early, as the child needs some such stimulant, having probably been several hours without nourishment. The after-treatment of special operations need not be gone into as it varies considerably. Each surgeon has his own methods and definite instructions are always given as to the nursing and management of such cases.

LECTURES TO THIRD YEAR PROBATIONERS.

LECTURE I.

ASEPSIS AND ANTISEPSIS.

Principles of Aseptic and Antiseptic Surgery—Germs and their Classification—How Germs Are Destroyed—Dressings—Instruments and the Care of Them—Ligatures and Sutures.

PRINCIPLES OF ASEPTIC AND ANTISEPTIC SURGERY.

Aseptic surgery aims at the exclusion of germs of any kind. In *antiseptic surgery* the germs are destroyed or their growth is prevented by means of chemicals.

GERMS OR BACTERIA.

Germs are small microscopic bodies, more akin to plant than animal life. They exist everywhere, multiply very rapidly, and, in the process of growing, form substances which are excreted by them. These substances are called *toxins*. Some of these micro-organisms are harmless, others are actively poisonous.

CLASSIFICATION OF BACTERIA.

1. Those which are round or globular, called *Cocci*.
2. Those which are straight or rod-like, called *Bacilli*.
3. Those which resemble a corkscrew, called *Spirilla*.

The *cocci or micrococci* are of different kinds.

When they occur in pairs they are called *diplo-cocci.* Pneumonia and some forms of meningitis are caused by these germs.

When they form grape-like bunches they are known as *staphylococci.* These are the pus forming germs. When they form long chains the term *streptococci* is given to them. Erysipelas and cellulitis are caused by streptococci.

The *Bacilli* or rod-shaped bacteria are found in such diseases as tuberculosis, typhoid fever, influenza, tetanus and anthrax.

The *Spirilla* or corkscrew germs are found in such diseases as syphilis, relapsing fever and cholera.

All germs multiply by simple fission (i.e. dividing into two) or by forming spores. Spores are endowed with extraordinary tenacity of life. They resist for long periods considerable degrees of heat and the action of strong chemicals. The process of division in bacteria goes on with prodigious rapidity. It has been computed that in twenty-four hours one bacterium may produce seventeen millions of its kind.

The greater number of bacteria are stationary, but some are mobile. They move probably by the fine thread-like *flagellæ* which are attached to them.

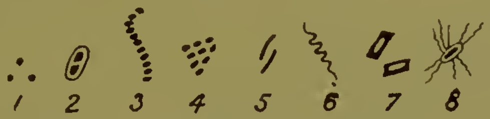

FIG. 31.—Various Forms of Bacteria. 1, Cocci; 2, diplococcus; 3, streptococcus; 4, staphylococcus; 5, bacillus; 6, spirilla; 7, bacilli with spores; 8, bacterium with flagellæ.

Micro-organisms can also be distinguished by the manner in which they grow. Sometimes they grow upwards in the culture tube, looking for oxygen, and are called *aërobic* *bacilli*; if they grow downwards into the gelatine in the tube, they cannot live in oxygen and are called *anaërobic bacilli.* Bacteria require moisture and heat in order to thrive, a temperature from 95° to 102° F. being most suitable to bacterial life. Extreme cold does not kill germs, it only paralyzes them. It is found that each germ has its thermal death point. Few of them survive a temperature of 260° F. Boiling for twenty minutes will kill not only the bacteria but their spores, which are much more resistant. Light kills many bacteria. This shows us the advantage of sunlight.

Bacteria are killed by being subjected to high temperatures and by the action of certain chemicals, the most powerful of which are carbolic acid, perchloride of mercury and biniodide of mercury.

In *aseptic surgery* all instruments to be used are boiled and placed in sterile water or carbolic lotion. The dressings are sterilized by means of moist heat. The part to be operated on is prepared by thorough cleansing and the use of antiseptics. The hands of the operator and his assistants are rendered surgically pure and india-rubber gloves which have been boiled are worn. Sterilized overalls are worn by the surgeon and by anyone helping at or watching the operation. The site of the operation is surrounded by sterile towels before the operation is begun. By these means bacterial infection is prevented.

In *antiseptic surgery*, an endeavour is made to destroy germs which are already there. This is the method originally practised by Lord Lister. Carbolic acid was the first antiseptic agent used by him and it is still the one in most common use. In dealing with wounds which are infected by germs the same rigid antiseptic precautions have to be taken as in dealing with clean wounds. A chemical which prevents the growth of bacteria is called an antiseptic. These chemical agents will be described in the lecture following this on sterilization.

DRESSINGS USED IN THE TREATMENT OF WOUNDS.

Gauze is a kind of cheese-cloth which is absorbent. It may be non-medicated (white), medicated with corrosive sublimate prepared with the double cyanide of mercury and zinc, *cyanide gauze*, which is coloured a pale mauve-pink, or impregnated with *iodoform* which is coloured yellow.

Gauze is used as a dressing for most wounds. It is sterilized. Iodoform gauze is used to pack wounds which are being treated by the open method, especially those of tuberculous origin.

Cotton-wool is largely used in all dressings. It is wool rendered absorbent by being freed from oily substances. It may be impregnated with different antiseptic agents. Boric wool, salicylic wool and sal-alembroth wool are sometimes used as surgical dressings; the first is coloured pink, the second is white with the salicylic crystals visible on it; the sal-alembroth is impregnated with corrosive sublimate and is stained blue to distinguish it.

Swabs or mops are made from pieces of wool teased out and rolled in gauze to form little balls, or gauze is used alone, folded so that there are no raw edges.

Wood-wool is more absorbent than cotton-wool and is often used for dressings when there is profuse discharge.

Lint is a cotton material with one side smooth and the other side fluffy and is much employed for fomentations. The smooth surface is placed next the skin. Boracic lint is impregnated with boracic acid and is generally coloured pink. Plain lint may be sterilized by boiling or by steam.

The boracic variety is wrung out of boiling water and applied.

Gamgee tissue is made up in large sheets which are cut to the size or shape required. It consists of absorbent wool between two layers of gauze and is useful for swabs, over-dressings, or for making pneumonia jackets.

Oiled silk, jaconet and gutta-percha tissue are used as impervious dressings over wet dressings to prevent the moisture from the lint or gauze being absorbed by the bandage. They are also placed over large raw surfaces or over the exposed bowel in colotomy to prevent gauze dressings from becoming adherent.

Drainage tubes are inserted in wounds if there is likely to be much oozing of blood, serum or pus. They are made of rubber or glass, are sterilized by boiling and are placed in an antiseptic lotion till required. A sterilized safety-pin is generally placed with them; it is fixed to the tube after insertion to prevent it from slipping into the wound.

Instruments and the Care of Them.

Surgical instruments are now made as simple as possible, and are all of metal so that they can be boiled. They are boiled for fifteen or twenty minutes in a fish-kettle or proper sterilizer. A little washing soda or bicarbonate of soda may be added to the water. When sterilized, they are removed on the tray of the sterilizer and placed in an instrument tray containing sterile water or carbolic lotion, 1 in 60. They may be emptied on to the tray, or, if heavy, lifted on to it by means of a pair of sterilized forceps.

Knives and needles should be wrapped in lint to prevent them being shaken against the sides of the sterilizer and getting blunted. Knives, scissors and needles should only be boiled for three minutes, as the boiling blunts the cutting edges. Some surgeons have their knives prepared by placing them in pure lysol, or in methylated spirit without boiling.

After use the instruments should be first washed in cold or tepid water, *not* hot water, because it coagulates the blood or pus on the instruments and makes them more difficult to clean. After washing in cold water, they are scrubbed with a nail-brush with soap and water in which some washing soda has been dissolved, then boiled and dried thoroughly before putting away. After use in a septic case, the instruments should be cleaned with a brush in a solution of 1 in 40 carbolic and then boiled.

The instruments must be preserved from damp so that they do not rust. If the plating is damaged by chipping, the instrument should be sent to be replated, as rust soon spreads once the plating has given way. Careless boiling spoils instruments. They should not be placed one on top of the other in the sterilizer or turned out roughly on a metal surface. They should be kept, when not in use, in a dry place free from dust. It is usual to keep them in glass cabinets which are air-tight but it is as well to have a dish with some quick-lime in it at the bottom of the cupboard. The quick-lime absorbs any moisture in the air and keeps it dry. The instruments should be placed separated from each other on shelves or hung on pegs in this glass cupboard. The more complicated instruments require to be taken to pieces for cleaning.

Mercury and its compounds should *not* be used as lotions in which to place surgical instruments because they corrode the metal. Carbolic, boracic and saline solutions, or sterile water are the usual agents for this purpose.

Ligatures and Sutures.—A ligature is the material used for tying a blood-vessel or pedicle. A suture is used to bring the edges of a wound together on the surface or in the depth.

All ligatures and sutures must be sterile before they are used in wounds and require careful preparation. Sutures are made of *silk*, *catgut*, *linen thread*, *kangaroo tendons*, *silk-worm gut*, *horsehair* and *silver wire*. They are prepared in different ways. Ligatures are either silk or catgut.

1. *Silk* is a very satisfactory ligature because it can be boiled. It is used in various sizes, Nos. 1 and 2 being useful for the ligature of blood-vessels. It may be prepared by soaking for twelve hours in ether and for another twelve hours in alcohol, then boiling it for ten minutes in a 1 in 1000 solution of mercury. It is then wound on glass spools with surgically clean hands and kept in absolute alcohol. It is again boiled for ten minutes before operation.

Another method is to roll the silk loosely in a piece of gauze and boil it for fifteen minutes, then remove it with a sterile forceps and place in absolute alcohol for twelve hours. Then wind the silk on to a glass spool out of the alcohol and boil again for ten minutes. Keep the reels covered with absolute alcohol in a glass jar. When required for an operation remove the reels from the jar with a sterilized forceps and place in a carbolic solution 1 in 60. Silk should never be boiled in soda. It may be reboiled once or twice but if too often boiled is apt to break.

Catgut is difficult to sterilize, but the methods given have proved satisfactory. Catgut is absorbed and disappears in a week or ten days or in two or three weeks if chromicized.

First Method.—Soak the catgut in ether for twenty-four hours to remove the fat, then soak in biniodide of mercury and spirit (1 per cent solution) for twenty-four hours. Change the lotion and soak again for forty-eight hours. Keep in a solution of carbolic acid and spirit (1 in 40), changing several times during a fortnight. Place in 1 in 60 carbolic lotion at time of operation.

Second Method.—The catgut is wound on to glass spools or left in the skeins and is placed in a glass jar containing a supply of iodine-spirit solution made up of 1 part of tincture of iodine in 15 parts of rectified spirit. The catgut should be left in this solution eight days before being used, but may be left in for an indefinite period. When for use at an operation, it should be placed in spirit and never in a watery solution which makes it swell up and become brittle.

Kangaroo Tendon is not much used now. It is sometimes asked for in hernia operations and in operations for movable kidney. It is prepared by soaking in ether and then keeping in an alcoholic solution of biniodide of mercury 1 in 1000 for at least a fortnight. The lotion in which it is put at the time of the operation must not be too hot.

Silk-worm Gut is of different thicknesses and is sometimes dyed various colours to distinguish the sizes. It is very easily prepared. The gut is twisted into coils of ten strands for convenience and is boiled for twenty or thirty minutes and kept ready for use in 1 in 20 carbolic solution. It should not be kept in spirit as it is inclined to become brittle. Any strands left over may be reboiled and placed in the stock-jar. Silk-worm gut is non-absorbent and is used for sutures.

Horsehair is used for sutures of wounds of the face or neck to avoid a scar and is also frequently used in operations on children. It is boiled in water for fifteen or twenty minutes, but, as it does not stand much boiling, it is better to be kept dry and prepared as it is required. It is placed in 1 in 60 carbolic lotion for use during an operation.

LECTURE II.

STERILIZATION.

Sterilization by Heat—Sterilization by Chemical Agents—Antiseptics in Common Use—Antitoxins and Vaccines.

To prevent septic infection of wounds, everything that comes in contact with the wound is thoroughly sterilized or disinfected. The aseptic method of treating wounds is to use as few chemicals as possible and to employ heat, either dry or moist, as a sterilizing agent. The two chief means of sterilization are therefore *heat* and *chemical antiseptics.*

1. STERILIZATION BY HEAT.

The most reliable germicide is heat in the form either of boiling water or of steam under pressure. Dressings, swabs, towels, overalls, caps and cotton gloves are sterilized in drums or kettles which are placed in specially constructed sterilizers and subjected to the action of saturated steam driven through them at high pressure. The drums are perforated so that the steam has a free passage through the articles, a sliding shutter being fixed so that the perforations may be opened during sterilization and closed when the drum is withdrawn from the sterilizer. The drums should be lined with lint or old linen before the articles are placed in them so that the articles to be sterilized do not come in contact with the sides of the sterilizer. A piece of linen should also cover the contents before the lid is closed. The articles to be sterilized must not be packed too tightly otherwise sufficient steam will not permeate them. The dressings may be placed in towels or calico bags if no kettle or drum is available.

The Sterilizer.—There are many forms of sterilizers and they differ in size. For small establishments such a sterilizer as that recommended by *Schimmelbusch* is sufficient. In large hospitals a larger plant is required and generally a high pressure sterilizer is installed (*Washington-Lyon*). Those sterilizers consist of a chamber in which the kettles or bundles are placed and an outer jacket in which the steam is generated to a temperature of 260° F., equal to a pressure of 20 lbs. When this amount of pressure or heat is obtained as indicated by the pressure gauge, the air within the sterilizing chamber is exhausted by means of an exhaust pump. The steam under pressure is then admitted into the sterilizing chamber where it permeates through all the articles, thoroughly sterilizing them. The process of sterilization is carried on for at least twenty minutes; the steam is then cut off from the chamber and that which it contains is exhausted by the vacuum apparatus, leaving the articles sterile and perfectly dry.

In large institutions the sterilizers are connected with the steam plant. The smaller sterilizers have to be filled with water to a certain level shown on the water gauge, the heating being done by a gas burner below. A thermometer is inserted in the middle of the cover and when it indicates a temperature of 212° F. the sterilizing begins and is continued for three quarters of an hour.

It has been proved that all bacteria and spores are destroyed by being subjected to compressed circulating steam at a temperature of 266° to 293° F. for fifteen minutes, and in preparing surgical dressings and all other articles used in

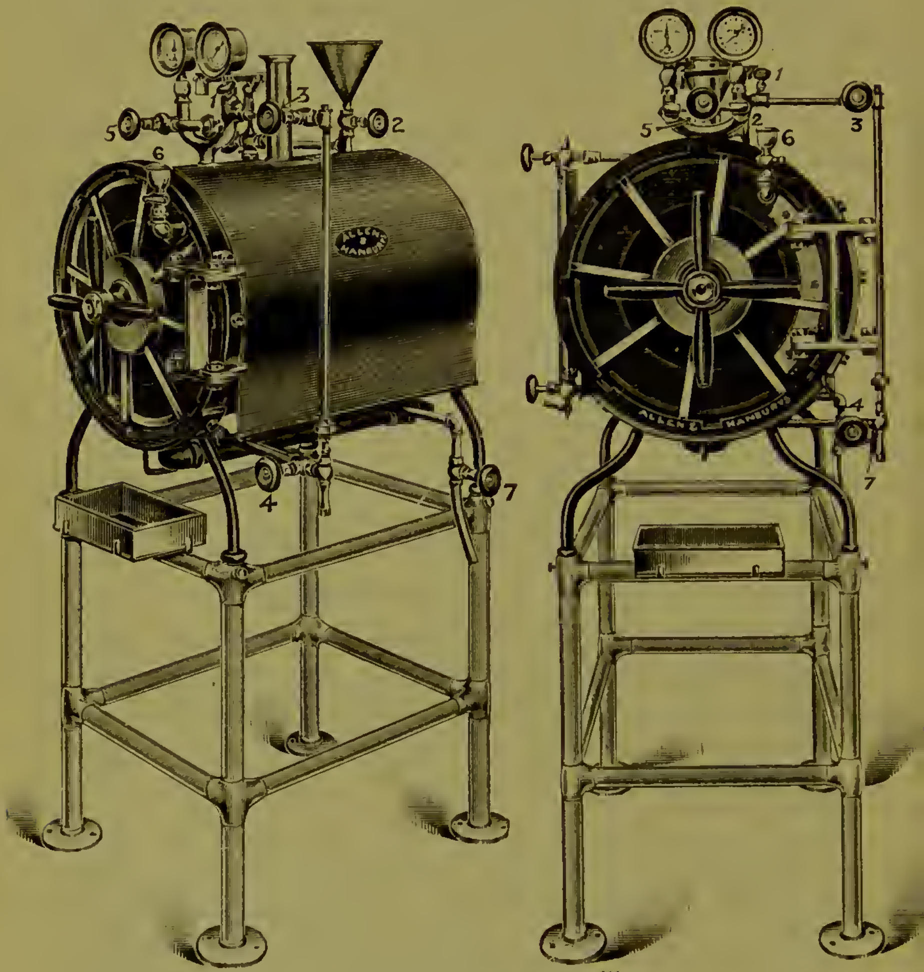

Fig. 32.—High Pressure Sterilizer.

operative work which can be treated in this way this is undoubtedly the most efficient means of sterilization. The dressings, etc., remain untouched in the drums until such time as they are wanted by the surgeon or nurse. The contents of a drum thus sterilized must only be touched by surgically clean hands or by a pair of sterilized forceps.

The next best means of sterilizing is *boiling*. Such articles as metal instruments, rubber appliances, glass and other vessels are placed in a special sterilizer or fish kettle and boiled for fifteen or twenty minutes in a solution of washing soda, one teaspoonful to a pint of water. When boiling glass or other articles liable to crack or break with the heat, it is advisable to place them in the sterilizer before the water has come to the boil.

2. Sterilization by Chemical Agents.

We have to depend on these for the purification of the patient's skin before operation, for the disinfection of the surgeon's hands or the hands of his assistants and for disinfecting instruments and apparatus which may be damaged by heat.

The number of these antiseptics is enormous and they are continually being added to.

Those which are most frequently used in surgical work are given below.

1. *Carbolic Acid* is one of the most reliable antiseptics though not the most powerful. It was the agent used by Lord Lister when he introduced antiseptic surgery in 1867. It is procured from coal-tar oil and the lotion is made by dissolving the crystals of the pure acid in water. The strength generally supplied to the wards and operating theatres is a 5 per cent solution (1 in 20). The advantages of carbolic are that it is clean and transparent, has no bad effect on metal instruments and is a reliable germicide. Its disadvantages are that it is very poisonous if swallowed or absorbed, it has an injurious effect on the hands and if applied as wet

compresses to the fingers or toes is apt to produce carbolic gangrene.

It is largely used for preserving sponges, ligatures and sutures after they have been sterilized ; for covering sterilized instruments during operations and for disinfection of linen and excreta in the nursing of infectious diseases.

Other *Coal-tar derivatives* in ordinary use are :—

Lysol.—This is a brown liquid of a syrupy consistence which is soluble in water. It is used in cleansing the skin of the patient and the surgeon's hands before an operation and also for vaginal douching. It is used in strengths of from 1 in 100 to 1 in 400, 1 drachm to a pint of water being a very usual proportion. It is less poisonous than carbolic, but as it forms a ropy mixture when mixed with pus or blood it cannot be used as a lotion for wounds.

Izal is used as a disinfectant for typhoid stools. It forms a white emulsion when mixed with water so is unsuitable as an agent in which to place surgical instruments.

Creolin and Cyllin are useful disinfectants of the same kind.

2. *Mercury* (*Hydrarg. Perchlor.*)—*Perchloride of Mercury*, *Corrosive sublimate* is used in strengths of from 1 in 500 to 1 in 5000. The strength most usually employed is 1 in 2000. It is mostly employed for disinfection of the hands and of the patient's skin. It is very poisonous, has a very destructive effect on metal instruments and is irritating to the tissues. It is transparent, is made up in tabloids which can easily be carried and is a powerful disinfectant and antiseptic.

Biniodide of Mercury is very much used in place of perchloride of mercury. It is used in the same strength as the corrosive sublimate and may be dissolved in water or in spirit. *Biniodide spirit*, 1 in 1000, is used by some surgeons for soaking the hands in before operating. Biniodide of mercury is a powerful germicide, is not irritating to the skin or wounds and does not corrode instruments to the same extent as perchloride.

Boracic or *Boric Acid Lotion* is a saturated solution of boracic crystals in water. It is a mild non-poisonous lotion useful for irrigating mucous surfaces. A solution of the acid in glycerine is used for painting the throat. It is also used as a dusting powder and in the form of ointment.

Peroxide of Hydrogen is a solution of hydrogen dioxide in water. It is non-poisonous and is a useful antiseptic, because, when brought into contact with blood or pus, it at once gives up its oxygen and a frothy effervescence is produced. It is largely used for the cleansing of septic wounds and cavities.

Iodine is now much used as an antiseptic, especially in the preparation of the skin before operation. The tincture of iodine is the solution used for this purpose. Iodine is also used to sterilize catgut in the proportion of 1 part of the tincture to 15 parts of rectified spirit.

Iodoform is a compound of iodine and owes its antiseptic action to the fact that when it is applied to the moist tissues of the body it liberates iodine. It is largely used as a dusting powder or gauze and is valuable as an antiseptic in wounds with a foul discharge and in tuberculous conditions. It may produce symptoms of poisoning if used too freely. Some people have a peculiar idiosyncrasy to iodoform. If it is absorbed by them, an erythematous or pustular rash develops. It has also been known to cause vomiting.

Formalin is an aqueous solution of formic aldehyde and in a 1 per cent solution is useful for purifying the skin before operation, or for washing out tuberculous sinuses. It can also be used as a spray to disinfect rooms and clothing. Formaldehyde is used for sore throat in the form of tablets which are dissolved in the mouth by the saliva. As a disinfectant for excreta a 1 in 10 solution of formalin is useful.

Silver Nitrate or *Lunar Caustic* is much used as an application in surgery. It slightly destroys the tissues, but is a powerful astringent and antiseptic. It is applied to granulating sores and is frequently used as an application to indolent ulcers.

Normal Saline Solution is so called because it has about the same amount of salt in it as is contained in normal blood serum. It is largely used to increase the amount of fluid in the body after hæmorrhage or in excessive diarrhœa and is given either by rectum or by subcutaneous or intravenous injection. It is used as a lotion, especially in abdominal operations, either to flush out the abdomen or to wring abdominal pads out of. It is *the* lotion when skin grafting is to be done. The solution is prepared by dissolving soloids of sodium chloride in sterile water or by boiling a teaspoonful of common salt in a pint of water.

Permanganate of Potash, is a salt containing manganese and potassium with an amount of oxygen which is easily given off. It forms a purple solution and stains the skin brown. It is used as an antiseptic in the strength of 1 in 1000 or as a gargle in the strength of 1 in 5000, usually about 1 drachm to a pint of water. It is also of value to destroy the poison of a snake-bite, the crystals being rubbed into the wound.

Condy's Fluid, is a preparation resembling permanganate of potash and has a similar action as an antiseptic.

TABLE OF LOTIONS IN COMMON USE.

Antiseptic.	Strength of Lotion.	Used for.
Carbolic acid	1 in 20	Disinfecting linen and stools To store sponges and swabs
	1 in 60	Immersion of instruments
	1 in 80-1 in 100	Antiseptic douching
Perchloride of mercury (corrosive sublimate)	1 in 1000	Disinfectant purposes
	1 in 2000	For dressings and cleansing of hands
	1 in 8000-1 in 10,000	For douching
	Tabloids, 1 dissolved in a pint of water = 1 in 1000	
Biniodide of mercury	1 in 4000	Preparation of skin. Rinsing of sponges. Lotion for operator's hands
Biniodide of mercury in spirit	1 in 500	Disinfecting the skin
Lysol	½ drachm to a pint of water	Vaginal douching
	1 drachm to a pint	Surgical purposes
Iodine	Tincture of iodine pure	For painting skin as preparatory dressing
	1 drachm to a pint of water	For douching
Boracic acid	1 in 25 saturated solution	
	1 in 100	For irrigating eyes, ears, nose, etc.

ANTITOXINS AND VACCINES.

Serum treatment is now so universally used that it is well for a nurse to know a little about the preparation of these agents.

Antitoxins are substances which are capable of neutralizing the effects of a *toxin.* A toxin is the poison produced by micro-organisms. It was found that if these antitoxic serums were injected subcutaneously into an animal, that animal was in time protected against the worst effects of the germs and their poisons. The antitoxin in most common use is the anti-diphtheria serum. It is prepared by obtaining the diphtheria bacillus from the throat of a person suffering from the disease and growing it on a medium of beef or veal bouillon. This is sterilized by steam and is then transferred to an incubator where it is kept for five to fifteen days at a temperature of about 100° F. During this time the bacilli multiply and the fluid in the flasks are charged with toxins. The culture is then filtered and the serum stored in small glass-sealed ampoules. This serum is then injected into a horse which is absolutely free from disease. Small doses are used at first, then increased every six days till a large quantity can be injected with impunity. The blood of the animal now contains an antidote or antitoxin which has been produced to counteract the effect of the toxin. At the end of six or nine months, blood is withdrawn from the horse by means of a sterile cannula inserted in the jugular vein. The blood is collected into sterile tubes, allowed to clot and the serum is then drawn off. This serum is treated with some preservative, tested as to its strength and when found to be trustworthy is placed in glass bulbs which are sealed in a gas-flame. The small bottles are then labelled with a statement as to the number of units and dated. The serum should be kept in a cool, dark place, such as the ice-box.

The Method of Administration.—The injection is given as a rule in the flank, abdomen, or in the back between the scapulæ where the skin is loose. The part must be prepared as for an operation. The serum syringe and needle are sterilized by boiling, the glass-sealed ampoule is broken open at the neck and the contents poured into the barrel of the syringe (or the bottle may have a rubber-cork). After the serum has been injected, the puncture is closed with a piece of isinglass plaster washed in carbolic acid (1 in 20), or a collodion dressing. The initial injection is usually 2000 units, but as much as 12,000 units may be given. The injections are also given intramuscularly and intravenously.

The *ill effects* of the administration of serum generally show a few days after the first injection. They are such symptoms as, urticaria, which may be seen round the punctures to start with and becomes general and often severe, pyrexia, itching, swollen glands in the neck and elsewhere, and pains in the joints resembling rheumatism.

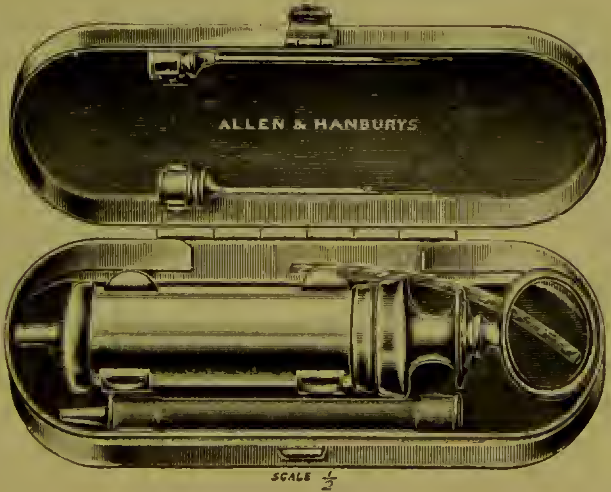

FIG. 33.—Antitoxin Syringe.

To Clean a Serum Syringe.—Immediately after use, the needle should be taken out, the serum left in the syringe emptied out and the syringe filled with cold water. The needle should then be replaced and the water in the syringe ejected through the needle. The needle may then be boiled, some absolute alcohol drawn through it, and a wire put in. The syringe must not be allowed to come in contact with hot water or carbolic lotion till it is well washed in cold water. The hot water and carbolic coagulate the serum and make the syringe very difficult to clean. After being well washed in cold water, the syringe is cleaned in soap and water, rinsed and then boiled; when boiled it is thoroughly dried with a soft towel.

Other serums used in the same way as the Diphtheria Antitoxin are :—Tetanus antitoxin, Anti-streptococcic serum, Anti-meningococcic serum.

Vaccines.

The fact having been proved that protection from disease can be secured by vaccination, many vaccines are now used in medical practice. The small-pox vaccine was the one first employed in this way. A child inoculated with cow-pox vaccine, i.e. "vaccinated," is found to be insusceptible to an attack of small-pox or at least takes it in a modified form. This protective inoculation has been extended to other diseases. Some vaccines thus employed are—typhoid vaccine, cholera vaccine, plague vaccine and tuberculin.

LECTURE III.

THE OPERATING THEATRE.

The Operating Theatre—Equipment of the Theatre—Plan of Operating Theatre—General Preparation of the Operating Room—Anæsthetist's Table and Requirements—Duties of the Nurses in the Theatre—How to Prepare for an Operation in a Private House.

THE OPERATING ROOM.

As we have seen, the nurse engaged in surgical work must be scrupulously attentive to all aseptic details. In the preparation for operations, the nurses in the theatre must realize that this attention to detail is of vital importance. Much of the success of operations depends on the conscientiousness and knowledge the nurse displays in her work. It is impossible for the nurse to be too careful in her preparation of the requisites connected with operation work, as it means so much to the patients undergoing such treatment.

The *modern operating theatre* is planned and constructed so that all the angles and corners are rounded off, to reduce the possibility of dust and dirt settling in crevices. The walls and floor are covered with some preparation having a smooth polished surface, so that the whole room can be washed down with a hose.

Good light is a necessity in operative work. The theatre may be lighted from above and also from one side. Ventilation is carried out artificially by means of air which is filtered and heated before being admitted, or naturally by allowing the incoming air to pass through wool or some such material so that it is freed from dust.

A well-equipped operating-room is provided with an apparatus for supplying large quantities of sterilized hot and cold water. The furniture is simple, made of metal and glass, so that it can be kept clean very easily.

A top floor of a building is generally chosen in constructing a theatre, as it is at a distance from the wards, the air being purer and a good roof-light more easily obtained. Attached to the theatre there should be a number of smaller rooms for different purposes; an ante-room in which the washing up and other preparations are made, and where the instrument cupboard may be kept; an anæsthetizing room, a sterilizing room and, if possible, a surgeon's room. Many hospitals have a theatre attached to the wards of each surgeon, and very often one theatre is specially set apart for septic cases.

THE EQUIPMENT OF THE OPERATING THEATRE.

The movable furniture of the theatre may consist of:—

Operation table.
Instrument table (sometimes curved).
Table for dressings.
Anæsthetist's table.
Anæsthetist's stool.
Wash-hand basin for operator.
Wash-stand with two or three basins.
Bottle-stand for solutions.
Stand for bowls, bottles, etc.
Wound irrigator.

PREPARATION OF THE OPERATING ROOM.

Cleaning.—The floors must be washed over, and the walls hosed down or washed. All dusting should be done with a damp cloth. The sinks, taps and all brass fittings must be thoroughly cleaned. The traps in the drains round the theatre must be removed and well flushed. The electric lights require special attention as to dusting.

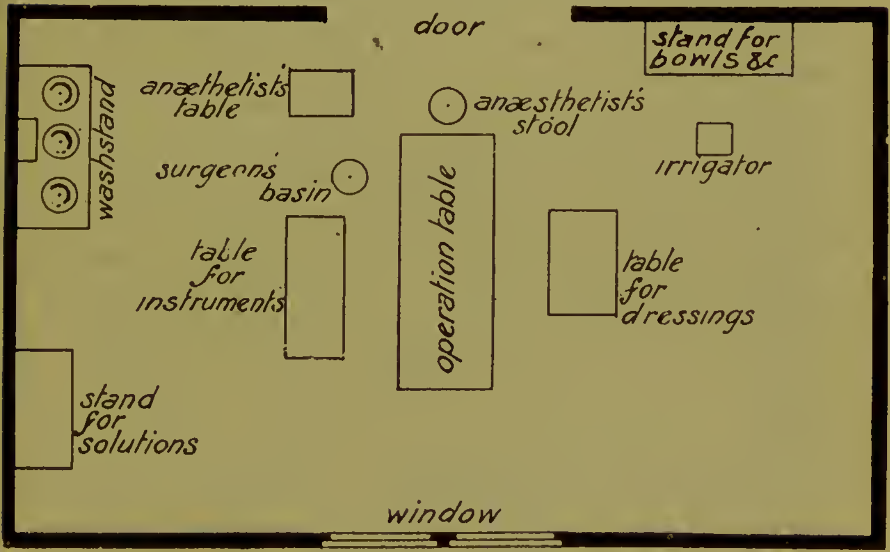

FIG. 34.—Plan of Operating Theatre.

Heating.—This must be regulated to suit the individual surgeon. If too hot, it is very trying for the operator and his assistants. The temperature should be as nearly as possible from 65° F. to 70° F.

Ventilation.—If it is necessary to open windows, it should be done some time before the time fixed for the operations, and the theatre will require to be dusted over with a damp cloth afterwards. A double layer of butter-muslin, wrung out of water so that it is damp, may be tacked over the opening of the window, if it is necessary to have it open during operation.

Utensils.—All bowls, trays, receivers, etc., require careful washing. They are then placed in the sterilizer and boiled. The sterilizer for bowls is fitted with a tap for emptying and a tray for lifting out. The utensils made of glass may be immersed in carbolic lotion, 1 in 20.

The theatre sister or nurse is responsible for the *selection* and *preparation of the surgical instruments*, and of the *ligatures* and *sutures* to be used. She must see that the drums containing the towels, overalls, swabs, dressings, etc., are in sufficient numbers and freshly sterilized. The rubber gloves are examined for punctures or holes, and only used if they are quite sound. They should be fastened in pairs, boiled for fifteen or twenty minutes, then placed in a bowl of sterile water or saline solution. If the surgeon uses them dry, they may be sterilized in the drums with the other requisites—or they may be boiled in the usual way and then folded in a sterilized towel. The nurse in charge of the theatre must see that all the apparatus is in good working order and ready for immediate use. Hypodermic syringes, oxygen cylinders, irrigators, transfusion apparatus and such requisites require constant care to keep them in good repair.

The *anæsthetist's table* should be prepared with the following requirements:—

Gas and ether apparatus.
Bottle of anæsthetic ether.
Bottle of chloroform.
Bottle of A. C. E. mixture.
A measure glass.
Drop bottles.

A mask for administering chloroform covered with gauze or lint.

A mouth-gag (mouthpiece covered with rubber tubing).

A tongue forceps.

A few sponge-holders with swabs.

A hypodermic syringe charged with strychnine.

Capsules of amyl nitrite.

A pot of vaseline.

A clean towel and receiver.

THE DUTIES OF THE NURSES IN THE OPERATING THEATRE.

One nurse is, as a rule, told off to do the duties which are not aseptic, such as carrying and emptying bowls of lotion and keeping the sinks where the surgeons wash their hands clean and tidy, refilling the washing bowls and reboiling the nail-brushes. She must be careful not to touch anything which is likely to be brought into contact with the wound. In carrying bowls of lotions, the thumbs must not be placed inside the bowl. This nurse for want of a proper name is often spoken of as the "septic" nurse. She may more appropriately be termed the "*non-aseptic*" *nurse.*

Another nurse may be told off to attend to the anæsthetist and do any small duties he may require.

The sister or *nurse-in-charge* in hospitals which are not medical schools has to hand all instruments, ligatures and sutures to the surgeon. She must also direct the nurses assisting her as to their duties.

The *most senior nurse* is in charge of the table containing the swabs and dressings. She hands them in a bowl or with forceps as needed. Some surgeons prefer to have the swabs taken directly from the sterilizing drums. She also washes out the sponges if necessary.

In abdominal operations, the nurse in charge of the instruments must know the exact number of instruments in use, so that there can be no possibility of leaving one inside when the wound is closed. For this reason, it is advisable to have the artery forceps put out in groups of twelve. In the same way, the nurse at the dressing table should count all mops and pads used during the operation and see that they are all returned to her, so that there can be no chance of leaving one in the abdomen. They are, as a rule, all counted before the surgeon begins to close up the wound.

Preparation of Sea Sponges.—Marine sponges are not used much now in surgical work, but some surgeons still prefer them because of their softness and power of absorption. The best quality of sponge is chosen, and for abdominal work special flat pieces are necessary. If new, they are first shaken and beaten thoroughly to remove the sand. They are then soaked for twenty-four hours in a solution of hydrochloric acid and water ʒi to Oi, to remove the bits of shell and coral; after which they are washed and squeezed in sterile, warm water at a temperature of 100° F. They are then soaked in a warm solution of soda (℥i of washing soda to a pint of water) for half an hour, to remove any fat or albumen, being rinsed again in warm sterile water to remove the soda. After immersion in a cold solution of sulphurous acid (1 in 5) for twelve hours, they are washed in sterilized water and squeezed as dry as possible, being then stored in carbolic lotion 1 in 20 ready for use.

After use in aseptic cases, they are soaked in cold sterilized water. They are then placed in a warm saturated solution of borax for twenty-four hours, after which they are squeezed and well washed in warm sterile water and placed in carbolic lotion (1 in 20) until required again.

Substitutes for sponges are made by making swabs of absorbent wool enclosed in gauze which can be sterilized. Abdominal pads are made in different sizes 4 by 6 inches or 6 by 8 inches being useful sizes. They are made of six layers of gauze with the edges folded in and stitched so that no free ends can be seen. They may have a tape sewn to one end so that they cannot be lost when used in abdominal operations.

HOW TO PREPARE FOR AN OPERATION IN A PRIVATE HOUSE.

1. *Choice of a Room.*—A room should be chosen with a south aspect and with windows so arranged that a good light is obtainable. It is an advantage if it is on the same floor as the room occupied by the patient. There should be a fireplace in the room.

2. *Preparation of the Room.*—The room should be prepared two days before if possible. All unnecessary furniture, pictures, curtains and carpets are removed. The room should then be thoroughly cleaned, the floor scrubbed and everything gone over with a cloth wrung out of 1 in 60 carbolic lotion. The fire should be lighted, so that the room will be well aired; on the day of operation the walls and all the furniture must be wiped over with a damp cloth which has been wrung out of carbolic lotion (1 in 60).

If the operation is an emergency one, it is a mistake to do too much in the way of moving furniture or dusting. The nurse should endeavour to disturb the dust as little as possible. Any cleaning or dusting must be done with a damp cloth and a damp sheet should be placed over the carpet.

The fire should be lighted, and the temperature of the room kept at 65° F. during the operation. The fire should not be poked just before an operation.

It may be necessary to have the operation in the patient's bedroom. If this is so, the bed must be placed in one corner and the preparation of the room carried out in the usual way.

A good light is essential, and the operating table should be placed so that the best light is got on the part to be treated. A screen of muslin may be placed on the lower sash of the window, or the glass rubbed with soap to obscure it if it is overlooked.

The *necessary furniture* will consist of:—

1. *The Operating Table.*—An ordinary kitchen-table, if not too wide, answers very well, or the leaf of a dining-table laid on trestles makes a good substitute. On the table is placed a folded blanket covered with a clean sheet. For warmth, a water pillow filled with hot water may be placed under the patient, or hot-water bottles, well protected with bags, may be placed round the patient. A small pillow for the head and a folded blanket to put on the patient should also be at hand.

If it is necessary to have the patient in the Trendelenburg position, an ordinary wooden chair so placed that the top of the chair and the edge of the seat rest upon the table may answer the purpose, but it is more satisfactory to hire a specially constructed table from the instrument-makers.

Two or three small tables will be required; one for the surgeon's instruments and lotion bowls, another for dressings and swabs and a third for the surgeon's portable sterilizer. These tables should be covered with clean towels and, if they are polished, it is advisable to put some layers of brown paper or a piece of American cloth under the towels. A metal tray may be placed on the table on which the instrument sterilizer is to be placed. A chair is placed at the head of the table for the anæsthetist (a cane-seated or wooden chair is best), and should be as high as possible, so that the face of the patient can be easily seen. Close by the chair, a small table should be put to hold the apparatus required by the anæsthetist.

A washstand with two basins, two sterilized nail-brushes in a bowl of lysol solution and two pieces of soap should be provided. Two small baths or pails are necessary, one for collecting any fluid and the other for dirty towels, etc.

General Preparations.

1. *Sterilized Water.*—An abundant supply of hot and cold sterilized water must be in readiness. A quantity of water should be boiled over-night and stored in large bedroom jugs which have been previously well cleaned and carbolized. After filling, the jugs should be covered with clean towels or pieces of gauze, so that no dust can get in. At the time of operation, more boiling water will be required and several boiling kettles should be available. The surgeon will require a quantity of boiling water for the sterilization of his instruments.

2. *Lotion Bowls and Other Vessels.*—Two or three dishes of some kind will be needed for the instruments and ligatures. Pie-dishes or developing trays used in photography are useful for this purpose. About six bowls or pudding basins will be required for lotions, swabs, towels, etc. Some small vessels should be at hand to receive anything removed by the surgeon during operation, to collect pus, and for the use of the anæsthetist if the patient is sick. All these vessels

must be thoroughly cleaned by soaking in soda solution and then rinsing in boiling water. If there is a copper in the house, it is easier to boil them for twenty minutes, and then lift them out with a sterile towel, placing them mouth downwards on a table covered with a sterilized towel.

3. *Towels.*—A sufficient number of small towels should be at hand; a few will be needed for drying the hands after washing; one is required for the anæsthetist's use, if the patient happens to be sick; four or five for covering tables, and at least half a dozen should be sterilized by tying them loosely in a cloth and boiling in a pot containing a solution of soda for fifteen or twenty minutes. They should then be lifted out and placed in a bowl of sterilized water or biniodide solution. These towels are wrung out and used to surround the immediate area of operation.

It is usual for the surgeon to bring with him or to send in advance many of the necessary articles, such as sterilized overalls, towels and dressings. It may be necessary for the nurse to provide bandages, and usually a special bandage such as a many-tailed or T bandage.

4. *Lotions.*—The lotions must be made up to suit the wishes of the surgeon. As a rule, a solution of lysol, in the strength of 1 drachm to a pint, is useful for preparatory dressings or for the surgeon's hands. "Soloids" for making solutions of biniodide or perchloride of mercury 1 in 1000, or 1 in 2000 are convenient as they are easily carried and do not require careful measurement. One dissolved in a pint of sterile water gives the necessary strength. Normal saline solution is often required and can be made in the same way with tabloids or by using common salt (1 drachm to a pint of sterile water).

LECTURE IV.

NURSING OF THE UNCONSCIOUS.

Concussion of the Brain—Cerebral Irritation—Compression of the Brain — Cerebral Abscess — Cerebral Tumours — Apoplexy—Uræmic and Diabetic Coma—Shock and Collapse.

NURSING OF THE UNCONSCIOUS.

MOST of the cases of unconsciousness one meets in hospital wards are due either to some injury to the patient's brain or to drunkenness. After a head injury, the patient suffers from a condition called *Concussion of the Brain* or stunning. The symptoms vary with the severity of the cause, from a transient state of giddiness and confusion of thought, to complete unconsciousness. .The patient, as a rule, lies on his back with the muscles relaxed, the eyelids closed, and the respirations are slow and sighing. The body is cold and clammy, the temperature subnormal and the pulse rapid and weak. This condition may continue for a few hours or may last a considerable time and pass into profound unconsciousness and death. If the case goes on to recovery, the patient gradually regains consciousness and probably suffers for some days from headache and a little fever. In severe cases there is sometimes a complete loss of memory, the patient having no recollection of events which followed the accident.

The *Treatment* consists in putting the patient to bed with the head low and keeping him very warm with blankets and hot bottles. Friction may be applied to the extremities. Stimulants are not given without the doctor's orders as such stimulation may produce hæmorrhage. A purge, such as croton oil or calomel, is administered when the patient has regained consciousness, or it may be given while he is insensible. The patient is afterwards kept on a low diet, and is not allowed any excitement. If the unconsciousness is prolonged, the head is sometimes shaved and an ice-bag or Leiter's tubes applied. The room should be kept darkened and very quiet. The feeding is done with a spoon if possible and, failing this, by nutrient enemata or nasal tube.

In a certain proportion of cases, the patient after a few days suffers from a condition of irritability of both mind and body which is called *Cerebral Irritation.* The patient lies in bed curled up on his side, with the eyes tightly closed, and is very irritable when roused. After a few days he is less irritable and there is an improvement in the condition of the temperature and pulse. The treatment in this condition is to keep the patient free from all noise and excitement. He is given a light nourishing diet. The head is placed low and, if necessary, shaved, and Leiter's tubes are applied so that cold is constantly kept on the head. Sometimes the patient will not allow this appliance to be used. The bowels are kept well open.

After any injury to the brain in which there is concussion the patient may pass into the condition known as *compression.* The compression in such a case is due to an extravasation of blood inside the cranium on the surface of the brain, or into the substance of the brain. Compression is also the result of severe injuries to the head as in fracture of the skull.

The *Symptoms* are slow and stertorous breathing, the lips and cheeks being puffed in and out. The loss of consciousness becomes more and more marked until there is a condition of coma and the patient cannot be roused. The pupils of the eyes are usually unequal and do not respond to light, but their condition varies according to the degree of compression. There is generally some rigidity of the limbs on one or other side of the body. The surface of the body may be cool or hot and perspiring; the temperature is usually raised and may be different on each side of the body. The bladder may be paralysed with consequent retention, and the fæces may be passed involuntarily.

If the compression is due to depressed bone or a foreign body, immediate surgical treatment will be necessary. The operation of trephining, i.e. the removal of a piece of bone from the skull is performed and the case is nursed as for concussion.

Cerebral Abscess may be due to some head injury, the organisms finding their way to the brain by the foreign body which caused the wound, or being carried by the blood; it is also due in some cases to infection after an operation on the ear such as mastoidectomy. The symptoms vary in their duration. Sometimes they last for months or they may end in death in a few days. The temperature may rise or may be subnormal, there may be rigors and the patient may complain of severe pains in the region of the lesion. Vomiting of a cerebral type often occurs. The patient usually lies in bed in a dull apathetic state and has loss of memory. In the later stages death is often sudden, the patient passing into a comatose state, or becoming delirious.

The *Treatment*, if an abscess is recognized, consists in giving an exit to the pus by means of a surgical operation, a piece of bone being removed with a trephine, and a trocar introduced for the purpose of exploring.

Cerebral Tumours are more common in men than women, and tumours of a tubercular origin are common in children.

The *Symptoms* are headache, often very severe ; vomiting is an early symptom, the food being returned without any feeling of nausea as soon as it is taken into the stomach ; convulsions do not always occur, but are sometimes met with ; optic neuritis is a usual symptom, and the patient may be dull and apathetic. Constipation is common in cases of this kind.

Treatment.—Some cases are successfully treated by operation. The headache is relieved by the application of ice to the head. In inoperable cases, an opening in the skull is made by trephining to relieve the tension. This does much to alleviate the intense headache and vomiting and the development of optic neuritis. In most cases, potassium iodide is ordered, and, when surgical treatment is not carried out, the symptoms of pain are relieved by opium and other drugs.

Apoplexy is caused by the rupturing of diseased blood-vessels in the brain.

The *Symptoms* are similar to those of compression of the brain. The breathing is slow and stertorous, the face is flushed and the patient is insensible and cannot be roused. The eyes are insensitive to light or to touch, and the pupils are unequal, one being dilated and the other normal, or both may be contracted. One half of the body is paralyzed and this paralysis is on the side of the body opposite to the lesion in the brain, due to the crossing of the nerves in the medulla oblongata. In severe cases, the pulse and respirations are very rapid and there is intense flushing of the skin and face, and profuse sweating. After a few hours, this flushing is replaced by great lividity, and the pulse becomes weaker and the breathing slower till death takes place.

Treatment.—The patient is placed in bed with the head and shoulders slightly raised. The stertorous breathing is diminished by placing him on his side. Hot bottles are applied to the feet, but must be carefully covered to prevent burning of the unconscious patient. An ice-bag is applied to the head. The bowels are opened by administration of castor oil or calomel, or an enema may be given. It may be necessary, if the coma continues, to catheterize the patient. A light diet is necessary but no stimulants must be given. Apoplexy is frequently mistaken for alcoholic intoxication. The symptoms are similar, but in alcoholic poisoning, the patient is not completely unconscious and there is no paralysis. The temperature in alcoholic poisoning is subnormal, whereas in apoplexy, it is generally above normal. The fact that the patient smells of drink should not be taken as conclusive, as the man may have had drink and, at the same time, be suffering from apoplexy.

Uræmic Coma is due to poison, owing to the kidneys failing to excrete a sufficient amount of urea, circulating in the blood, and is met with in different forms of Bright's disease. The coma is occasionally preceded by convulsions resembling those of epilepsy or it may come on suddenly. There is no stertorous breathing as in apoplexy, but the patient sinks into a condition of stupor which is followed by complete unconsciousness. The condition is treated by the administration of diaphoretics and by purgatives.

Coma is also met with in cases of diabetes and is called *diabetic coma*. It is usually fatal. Intravenous injections of saline are given and large doses of bicarbonate of soda.

SHOCK AND COLLAPSE.

Shock is a great depression of the action of the vital organs of the body produced through the nervous system. It is due to many causes and manifests itself chiefly in the lessening of the force of the circulation.

It may be due to:—

1. An injury or operation.
2. Loss of blood.
3. Pain, as in renal colic or in burns.
4. Septic poisoning, e.g. in peritonitis.
5. Mental emotion such as sudden sorrow or fright.
6. Exposure to cold.

The more vital the organ affected and the more serious the injury, the greater will be the degree of shock. Parts richly supplied with nerves such as the abdominal viscera and the organs of the chest, if damaged or operated on, produce considerable shock. Highly strung patients, suffer more from shock than phlegmatic ones.

The *Symptoms* are great prostration, the face being pale, the skin cold and clammy, the features drawn and the eyes sunken. The lips and ears are livid. The pulse is rapid, weak and almost imperceptible; the respirations are irregular, shallow and sighing in character; the temperature is subnormal and may fall to 96° F. or lower. The patient's mind is dull and he complains of thirst. There may be incontinence of urine and fæces. In the period of reaction, there is generally nausea and vomiting, and the pulse becomes full and bounding and the respirations more regular. The temperature rises to 100° F. or more.

Treatment.—The patient should be placed in a recumbent position with the head low. The foot of the bed is raised to promote the supply of blood to the nerve centres. The bed may be placed near the fire and the patient surrounded by warm blankets, and hot-water bottles which must be well covered. If there has been much loss of blood, the limbs should be wrapped in cotton-wool and bandaged firmly from below upwards to allow the blood to circulate mostly in the trunk and head.

Enemata of saline solution and brandy, or of coffee and brandy may be given. If the patient can swallow, hot stimulating drinks such as coffee or whisky may be ordered by the surgeon, but should never be given by the nurse without definite orders. If the shock is due to much loss of blood, continuous infusion or intravenous injection of normal saline solution is resorted to. Ether or strychnine may be ordered as a heart stimulant. The extreme thirst is best relieved by small quantities of warm water, or by an enema of warm water or saline. If there is much pain, an injection of morphia will probably be ordered. In grave cases, oxygen is sometimes administered or artificial respiration resorted to.

Collapse is an extreme degree of shock. It comes on more insidiously and does not reach its final degree of severity for several hours. It is met with in severe illnesses, especially those in which there is excessive diarrhœa or vomiting or profuse sweating.

It may follow shock in cases of perforation of the intestine, or after abdominal operations where peritonitis is a complication. Sudden severe hæmorrhage is often followed by a degree of collapse.

The treatment is the same as for shock.

LECTURE V.

THE NURSING OF SICK CHILDREN.

Observation of the Child—Points of Difference between Children and Adults—The Feeding of Infants—Administration of Medicines and Stimulants—Some Diseases of Childhood.

THE NURSING OF SICK CHILDREN.

THE nursing of sick children is in many ways more difficult than the nursing of adults. This is due to the fact that the child is unable to tell us his feelings or to give any help in discovering symptoms. Much more patience is consequently required in dealing with helpless infants.

A certain amount of information can be gained by studying the *appearance and expression of the child's face*, and the *attitude in which he lies.* In lung affections, the child takes very little notice of anything, the face is flushed, the eyes bright but the general expression is dull and anxious with a look of suffering. Knitting of the brows is an indication of pain and is common in cases of meningitis. In acute diarrhœa and vomiting, the eyes have a staring look and are very sunken; with adenoids, there is a distinct dull expression and the mouth is usually kept open. Great weakness may be shown by the child lying with half-closed eyelids when asleep, but this symptom is not always a serious one. Attitude is also a help. In the ordinary way a child lies on its side when asleep. With any degree of dyspnœa it is more likely to lie on its back. Rolling the head from side to side or clasping it firmly with both hands often indicates headache or ear trouble. If there is abdominal pain, the legs are drawn up. Head retraction with rigidity of the neck generally indicates meningitis. Night startings or pains are a symptom of acute hip or other joint disease.

The *cry* is characteristic in some diseases. There is the short, catchy cry of acute pneumonia; the hoarse, whispering cry of laryngitis; the wail of abdominal disease; the whine of the marasmus baby; the sharp cry, whenever it is touched, of the child with scurvy; and the shrill piercing scream or "hydrocephalic" cry of tubercular meningitis.

Children differ symptomatically from adults in many ways.

The *temperature* in infants is always higher from the same cause than in adults. Very high temperatures are frequently met with in comparatively mild illnesses; an attack of colic is sufficient to send an infant's temperature up to 103° or 104° F. A continuous high temperature is of much more significance than a single rise above the normal rate. In chronic wasting diseases, it is quite usual to record temperatures much below normal,—95° or 96° F. are common and sometimes lower than that are charted.

Immediately after birth, the temperature of the baby is about the same as that of the mother. A few hours after, it is generally found to be about 99° F. The temperature of infants and young children should always be taken in the rectum; records taken in the groin or axilla are untrustworthy.

The *pulse rate* during the first year is about 120. By the third year, it has decreased to 100 and has reached the adult rate when the child is fourteen. In young children the rate of the pulse is of less importance than the force. Quite slight causes, such as a fit of crying or the approach of a stranger, are sufficient to increase the rate by 20 to 30 beats. A slow, irregular pulse is suggestive of tubercular meningitis or some other cerebral trouble; if it is rapid, it is more suggestive of post-basal meningitis. In acute diseases, a pulse rate of 150 is quite common, and frequently the rate increases to 170 or 180.

The *respirations* usually number about 40 per minute at birth and gradually decrease till, at the age of five, the rate is about 24. In acute diseases of the lungs, it may rise to 70 or 80 and has even reached in some cases to 100. Irregularity in the respirations is a symptom of brain disease—usually of meningitis.

The *circumference of the head* at birth is 13 inches and by the end of the first year it is eighteen inches. The anterior fontanelle should be completely closed by the time the child is eighteen months old. If it is still open at that time, it is an indication that the child has rickets or is suffering from cretinism or hydrocephalus.

The average *height* of an infant at birth is 20 inches. It gains rapidly in length during the first year, growing about 8 inches, after which it continues to gain from 2 to 3 inches each year until the age of eleven. Children with rickets are, as a rule, shorter than others.

The *average weight* of a healthy child at birth is 7 lbs. During the first few days, it loses a little but by the end of the week, begins to gain. During the first three months, the gain is about 6 ozs. per week, after which the increase slowly diminishes till, at the end of the first year, it is gaining 2 ozs. per week. At a year old the average child weighs nearly three times as much as at birth. The weight is of much importance. A child, who is not gaining in weight, is probably being improperly fed or has some disease. It is usual to weigh babies once a week during

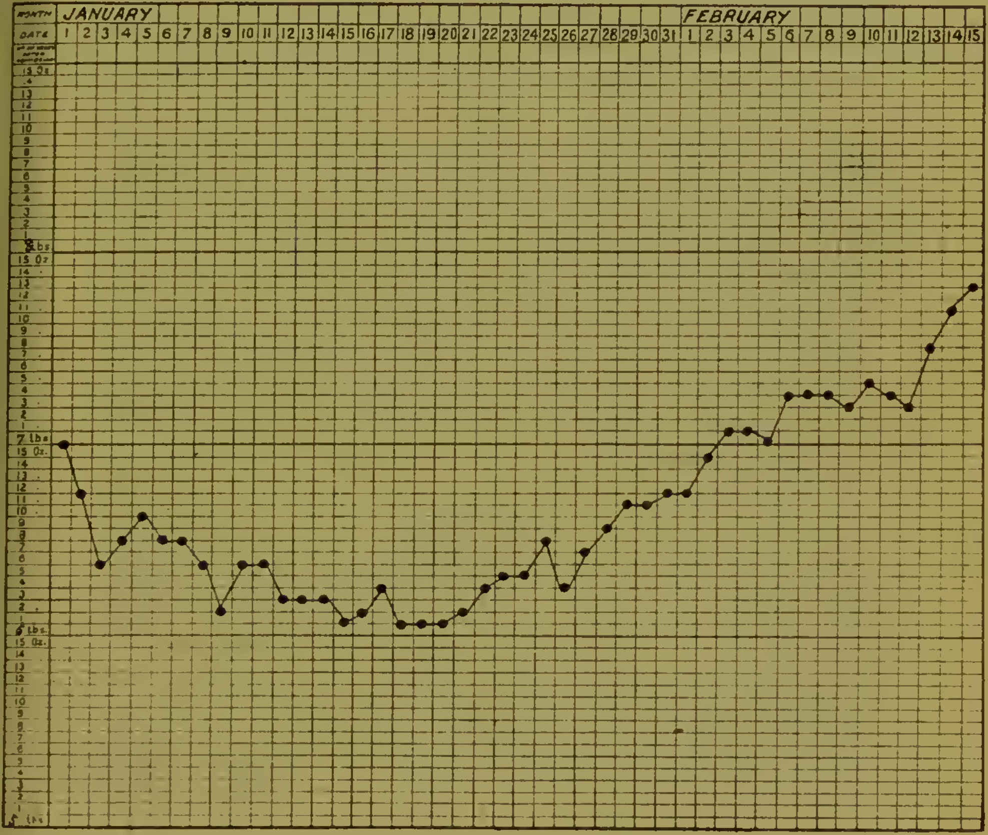

FIG. 35. Weight Chart.

the first six months and twice a week during the rest of the first year. In hospitals, the weighing is done daily in cases such as congenital hypertrophic stenosis of the pylorus, and the weight is recorded on a chart for that purpose.

The Development of the Child.

A normal infant begins to take notice of things during the third month; by the end of the fourth month, it holds its head up; at the seventh month, it will sit up if supported. Between the sixth and ninth months, the first teeth are cut; at the tenth month it is able to stand; from the twelfth to the eighteenth month, the child begins to walk, and also to talk; by the end of the second year, it is able to put words together into short sentences. As a rule, if a child of two years has made no attempt to speak, it may be surmised that there is some mental defect.

The *stomach* of an infant is like a dilated tube and it lies more vertically in the abdomen than in later life.

The capacity of the stomach of an infant at birth is about 1 oz.; at three months, 4½ ozs.; at six months, 6 ozs.; and at twelve months, 9 ozs.

The Teeth.

The *deciduous or milk teeth* are twenty in number, and they appear between the sixth and the thirtieth months. The two lower central incisors appear about the sixth month, the two upper about the eighth month, and the other sixteen are erupted gradually till the child is two and a half years old. Six teeth should have appeared by the time the child is a year old; sixteen by the end of the second year, and the set of twenty should be complete by the time the child has reached the age of two and a half.

The *permanent teeth* begin to appear during the sixth year; the first molars during the sixth year; the eight incisors from the seventh to the ninth year, and the complete set of thirty-two by the twenty-fifth year.

During the period of teething, there may be some discomfort with slight rise of temperature, but the cutting of teeth is a natural process, and is not responsible for the many ailments generally ascribed to it. A child should not be given hard substances to bite during teething as that only hardens the gums and delays the eruption of the tooth ; a soft rubber ring is better.

Sleep.

During the early weeks of life, a child sleeps for about twenty hours out of the twenty-four, only being awake while he is fed or bathed. The need for sleep gradually gets less, till, at the end of the first year, fourteen or sixteen hours is sufficient, and during the second and third years twelve to fourteen hours is allowed ; an hour or two of this sleep should be taken in the afternoon. A nervous child should be induced to take as much sleep as possible as he is then more likely to grow out of his nervousness. Disturbed sleep in a child is generally due to some digestive trouble. Sleeplessness, accompanied by starting pains, is an early symptom of hip-joint disease. The condition called *night terrors* is caused by some disturbance of the nervous system. The attack comes on quite suddenly, the child waking out of sleep and sitting up in bed in a state of terror, being afraid of "a bear" or "big dog" or some vision which has produced the fright. If the attack is repeated, some sedative is given at bedtime.

The Feeding of Infants.

The best food for infants during the first seven months of life is their mother's milk. It contains all the constituents necessary for the proper growth of the child, and these are in suitable proportions. A breast-fed baby has more chance of growing up healthy than one fed artificially ; it is practically immune from infectious diseases, especially measles, and it runs very little chance of contracting summer diarrhœa.

A healthy baby should be put to the breast every two hours during the day for the first six weeks, and once or twice in the night. From six weeks to three months, the intervals between the meals may be two and a half hours, and one feed given in the night. From the fourth to the ninth month, the infant requires feeding every three hours during the day, and only once, or not at all at night

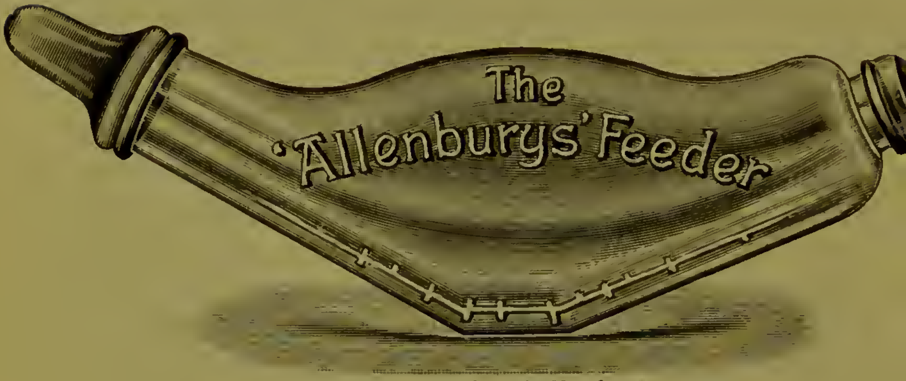

Fig. 36.—Allenbury's Feeder.

The infant should be weaned at nine months. This process will be easier if the baby has had one bottle feed every day after it is a month old.

It may be necessary to feed the child artificially if the mother has insufficient milk, or because of illness or disease of the mother, and in cases where the child itself is ill and admitted into hospital.

A *feeding-bottle* is a necessity in this form of feeding and the best bottle is one that can be kept scrupulously clean. The boat-shaped one of the Allenbury type is in every way most satisfactory. It allows of a free flow of water through it. It should be thoroughly rinsed in cold water after use, then scalded with very hot water and placed in a basin of cold water which should entirely cover it. The teats and valves should be turned inside out, thoroughly washed, and rinsed and kept in water till required.

Failing mother's milk, the best substitute we can get is *cow's milk.* It is, however, too strong for the child and requires to be diluted with water, lime-water or barley water in order to reduce the amount of proteid in it. The composition of human milk and of cow's milk is as follows :—

Human Milk.		*Cow's Milk.*	
Water	87-88	Water	86-87
Fat	4·	Fat	4·
Proteids	1·-2·	Proteids	3·-4·
Milk-sugar	7·	Milk-sugar	4·5
Salts	0·2	Salts	0·7

This dilution diminishes the amount of fat and sugar also, so that it is necessary to add a little cream and a quantity of sugar of milk before giving the diluted milk to the infant. Barley water is one of the best diluents if it is carefully made ; it makes a curd much more like the curd of mother's milk. In order to render the milk sterile, different methods are resorted to—simple boiling, sterilizing and pasteurising. The sterilization of milk is considered by some doctors to be attended with the greatest danger to nutrition. Scalding is looked on more favourably. Many, however, insist on its sterilization. In the preparation of milk for infant feeding, many different apparatus are used. Aymard's Patent Sterilizer and Soxhlet's Apparatus are two of the best known.

Milk is sterilized by being kept at 212° F., i.e. at boiling point, for thirty minutes. It is pasteurised by being kept at a temperature of 155° to 167° F. for thirty minutes.

Regularity of feeding and scrupulous cleanliness in every detail are essential. It is hardly possible to give definite instructions or to draw up tables, as each individual case has to be considered by itself, especially in dealing with sick children.

The following table of quantities may be found useful:—

Age.	Milk.	Water.	Sugar of Milk.	Cream.	Total Quantity.	Number of Meals.
3 days	ʒ ii	ʒ vi	⅓ teaspoonful	—	℥ i	2 hourly in the day—twice in the night
10 ,,	ʒ iii	ʒ vii	½ ,,	m xxx	ʒ x	2 hourly in the day—twice in the night
21 ,,	ʒ vi	ʒ x	¾ ,,	m xl	℥ ii	2 hourly in the day—twice in the night
1 month	ʒ viii	ʒ xii	¾ ,,	ʒ i	℥ iiss.	2 hourly in the day—twice in the night
2 months	ʒ x	ʒ x	¾ ,,	ʒ i	℥ iiss.	2½ hourly in the day—twice in the night
3 ,,	℥ ii	℥ iss.	1 ,,	ʒ ii	℥ iiiss.	3 hourly in the day—once in the night
4 to 6 months	℥ iii to ℥ iv	℥ ii	1 ,,	ʒ ii	℥ v to ℥ vi	3 hourly in the day—once in the night
7 to 9 months	℥ v to ℥ vi	℥ i	½ ,,	ʒ i	℥ vi to ℥ vii	3 hourly in the day—twice in the night
1 year	℥ viii	—	—	—	℥ viii	At a time

At a year old, a child may have, in addition to the milk, a lightly boiled egg, bread and milk, porridge and milk, gravy and breadcrumbs, and custard pudding; but, until a child is over two years of age, milk must continue to be its chief food.

Many artificial foods are now on the market, but the majority of them contain starch and are unsuitable. A baby should have no starch food till it begins to cut its teeth.

A child should not be left alone while sucking a bottle, and the proper position for it to lie in when being fed is that in which it would lie if taking milk from the mother's breast. Feeding of sick children is sometimes difficult. If there is any difficulty of breathing or sucking, the infant may be fed from a minim measure or by a spoon.

Forced feeding is often necessary, either by the nose or by the œsophageal tube. These methods may be used in the rearing of premature infants, or in babies too weak to suck or swallow. - Forced feeding is also useful in cerebral cases, in cases of tetanus and in diphtheritic paralysis affecting the pharynx. The method of administration has been described (Lecture VIII. to First Year Probationers).

ADMINISTRATION OF MEDICINES.

Children take drugs well if they are seriously ill. Refusal of medicine is more often met with in children with slight ailments. It is a mistake for a nurse to tell a child that a nauseous medicine is nice, or to disguise a drug in any food medium; this latter method often gives the child a dislike for that particular article of diet. Cod-liver oil is frequently ordered in cases of debility and rickets. From 10 minims to a teaspoonful, according to the age of the child, is the ordinary dose, given two or three times a day. A valuable substitute for cod-liver oil is Virol. It consists of bone-marrow, malt and eggs and may be mixed in the baby's milk. Arsenic is given in some forms of anæmia and in the treatment of chorea. The nurse must be on the outlook for signs of poisoning with this drug; the chief signs are flushing of the skin, vomiting and diarrhœa. Opiates are not much used in the diseases of infancy, as the child is very susceptible to their action. Opium is chiefly employed in allaying pain or in quieting the action of the bowels. Chloral is well borne by quite young infants; with young babies, it is best given by the rectum; it is most useful in cases of infantile convulsions. Belladonna is taken well by children and is given in larger doses than most drugs. It is frequently ordered in enuresis. Mercury, in the form of grey powder and calomel, is much used in childhood in the treatment of syphilis and other conditions.

Stimulants.—These are often of great use in acute diseases in which there is much depression of the vital powers. In toxic diseases such as diphtheria, and in cases where there is much reduction by diarrhœa and vomiting, alcohol is very useful. It is seldom ordered in acute febrile diseases when the temperature is high, but may be valuable in cases like lobar pneumonia, after the crisis. Alcohol should be well diluted when given to infants and should never be given in a whole feed, because the child may refuse to finish the feed and so lose some of the necessary stimulant.

Some Diseases of Childhood.

Congenital Heart Affections.—The two most marked symptoms of this condition are cyanosis and clubbing of the fingers and toes. The extremities are not only blue but are also cold and numbed. The children thus affected are small, as a rule, and are very liable to bronchitis and other chest troubles.

The treatment consists in allowing the child to lead a quiet, unexciting life. The least annoyance or excitement is often sufficient to bring on a cardiac attack. Children with this disease should not be sent to school at an early age and should never be overtaxed with work. They require much judicious humouring.

Marasmus.—This is an extreme form of malnutrition most often seen during the first months of life. It is characterized by wasting; the infant becomes very emaciated and wears an anxious look. There is much fretfulness and the cry is like a feeble whine. The fontanelle is very depressed.

The treatment consists in keeping up the body temperature. This may be done by rolling the infant in cotton-wool and by the use of the electric cradle. The diet has to be of a kind that the child can easily digest and still be nourishing. In some cases the milk is pancreatised, or a mixture containing whey is found suitable.

Rickets.—This disease is commonly looked upon as a bone disease, but it is more properly a general disease of the nutrition which affects the bones more than the other tissues. One of the chief causes is artificial feeding, and the disease commences sometime during the first year, usually about the sixth to eighth month. Excessive perspiration is an early symptom; the sweating is most marked about the head, the child is very restless and peevish, and throws the bedclothes off. The body and limbs are tender and the child is disinclined to move the limbs. The ends of the bones become enlarged and the shafts soft and easily bent; the ribs have bead-like thickenings, known as the "rickety-rosary". The abdomen is always protuberant, and dentition is usually delayed beyond the normal time; when the teeth do appear, they are very defective and decay quickly.

The treatment consists in regulating the diet and improving the hygienic conditions. The first thing is to see that the child is having a suitable diet at regular times. Fresh air and sunshine are essential. Cod-liver oil and malt or Virol are given.

Cancrum Oris or *Gangrenous Stomatitis* is a rare disease and a very fatal one. It is a sequela to the infectious fevers, especially measles. It begins as a small red patch on the gum or on the inner aspect of the cheek; this spreads rapidly, destroying all the tissues affected, and resembles moist gangrene. The breath is very foul; the majority of cases die from exhaustion or from pneumonia. The part may be excised and the tissues cauterised. The child must be fed at frequent intervals, and stimulants are almost always necessary.

Congenital Hypertrophic Stenosis of the Pylorus.—This condition is due to the pylorus becoming thickened and hypertrophied at the end nearer the duodenum. The symptoms show a few days after birth, persistent vomiting, and constipation, or in some cases diarrhœa, being the chief signs. The child loses weight very rapidly and becomes pale and emaciated.

Surgical treatment at an early stage in the disease is the only means of prolonging life.

Intussusception.—This is a common form of obstruction occurring in infants and young children. It is a condition in which one part of the bowel slips into the portion immediately adjacent. The symptoms are vomiting, and straining with the passage of mucus and blood by the bowel; the child's face is pale and drawn and there is generally pain, causing the child to cry out. A rectal examination is made as a help to diagnosis. Opiates are given to arrest the peristaltic action of the bowels, and an endeavour is then made by the doctor to disengage the invaginated bowel. Air or water may be injected into the bowel to try to reduce the intussusception. Failing this, operative treatment is carried out. After operation, if vomiting continues, the stomach is washed out. The case is nursed like an ordinary abdominal one with a pillow under the knees. If at all possible, the child should be breast fed if it is at that age; if not, for the first day, sterile water or albumin water is given and afterwards diluted milk. The aperient is given between the second and fourth day after operation, and the stitches are removed on the twelfth day.

Imperforate Anus.—This is a condition in which there is improper development causing deformity of the anal canal. In some varieties, there is only partial obstruction so that the meconium and fæces may escape in small quantity; in others, the anal orifice is completely absent. The abnormality may not be noticed till the attention is drawn by the fact that the infant's bowels have not moved. Surgical treatment is resorted to at once, an orifice being made so that the bowel is relieved.

Spina Bifida is a congenital defect in the vertebral arches which allows the spinal membranes to protrude. It occurs most commonly in the lumbar region. It is generally associated with other deformities such as talipes. Many cases die from convulsions soon after birth, or, if life is prolonged, paralysis ensues. The treatment consists in avoiding pressure on the part by applying a well-fitting shield over a pad of wool. Antiseptic dressings may be applied if there is a broken surface. Operative treatment is often successful.

Meningocele is another congenital defect in which there is a protrusion of the cranial contents through the bones of the skull. It is commonest in the occipital region, and forms a tense smooth swelling which contains cerebro-spinal fluid. The protrusion must be protected from irritation or infection by the application of soft antiseptic dressings. Surgical treatment is necessary, but, if the tumour is very large and contains brain substance, the surgeon seldom operates.

Hydrocephalus.—This disease is characterized by a steady enlargement of the skull in which the occipital and frontal bones are very prominent and all the bones are very thin. The fontanelles are very large. The head is so large and heavy that the child is unable to support it. The condition may be congenital or acquired. Convulsions are a common symptom.

The treatment consists in keeping up the strength. Inunctions of mercurial ointment are employed. Tapping is sometimes resorted to.

Tuberculous Meningitis.—Inflammation of the membranes of the brain, due to infection by the tubercle bacillus, is one of the common forms of meningitis in children and recovery is rare. The child becomes languid and drowsy, and has attacks of vomiting; the temperature rises to 104° or 105° F., while the pulse is rapid in the first stages, then irregular and hesitating in the comatose state; the breathing is very quick and towards the end may be of the Cheyne-Stokes nature. The child, if old enough, complains of pain in the head, or, if an infant, turns the head restlessly from side to side; the eyes squint and twitchings and convulsions set in. The muscles of the head and neck contract so that the head is retracted and the child utters the piercing cry which is so typical of the disease.

These cases are very hopeless. The nurse endeavours to do everything to alleviate the sufferings of the child. The bowels are kept open and attention is paid to the quantity of urine passed, as retention in such cases is not uncommon. When the child cannot swallow, feeding may be done by the nasal tube. The eyes require care, as the lids do not close; they are bathed frequently with boracic lotion. Bedsores are liable to form and must be prevented. Cold may be applied to the head or neck by means of an ice-bag.

LECTURE VI.

OPHTHALMIC NURSING.

Some Diseases of the Eye—Irrigation of the Eye—Administration of Eye Drops—To Apply Ointment to the Eye—Remedies Used in Treatment of Eye Diseases—Preparation of Patient for Eye Operations—After-treatment of Operations on the Eye.

SOME DISEASES OF THE EYE.

Conjunctivitis.

THE most common disease of the eye met with in nursing is probably inflammation of the conjunctiva, *conjunctivitis*, or as it is sometimes called, *ophthalmia.* The eye becomes red and secretes a discharge which varies in character; in mild forms it is thin and watery, in severe cases thick and purulent. Purulent ophthalmia is met with in the new-born child and also in the adult. It is highly contagious and is capable of being carried from person to person either directly or indirectly by means of the fingers or of towels and swabs. One of the most contagious forms is the acute purulent ophthalmia caused by the presence of gonorrhœal matter in the eye. It is usually seen in the new-born infant and is due to infection during its passage through the mother's vagina. When one eye is affected in this way, every endeavour must be made to keep infection from the other. This is done by covering the sound eye with an antiseptic dressing or it may be protected by the method known as Buller's Shield, if the patient is an adult.

To Make a Buller's Shield.—Two pieces of plaster are taken, one about 4 inches square and the other about 4½ inches; a circular hole is cut in each and the larger piece is fixed to the convex side of a watch glass and the smaller piece to the concave side. In this way, the glass is fixed between the two pieces of plaster and is placed on the eye, the overlapping margin of plaster keeping it in place; it may be necessary to fasten it more securely on the side of the nose with extra strips of plaster. The lower part of the outer side is left open to admit air and prevent inflammation. This shield allows of the patient using the sound eye and is to be preferred to the antiseptic dressing. It may be worn for several days without changing. Young children cannot wear this shield, so in their case it is better to use an antiseptic dressing and to change it daily.

Treatment of Ophthalmia.—A patient suffering from this disease should have all his washing utensils kept apart from those in common use. All dressings and swabs should be burnt, and every measure taken to prevent the spread of the disease. The nurse in charge of such cases must carry out the most conscientious antiseptic treatment as regards her own hands. In treating the affected eye, the discharge should be allowed to escape freely. The eyes are frequently bathed with lotion (perchloride of mercury 1 in 5000 at a temperature of 100° F.) applied by squeezing a piece of cotton-wool soaked in the solution, directly over the eye on to the conjunctiva. The lotion, as it runs out, is absorbed by a piece of wool pressed on the cheek on the same side, or a suitable receiver may be used. Ointment is smeared over the lids to prevent them from sticking together with the discharge.

In the new-born, this disease, *ophthalmia neonatorum*, is the cause of many eye diseases and of blindness. The infant's eyes, after birth, require to be carefully washed, and if there is any suspicion of discharge or infection, drops may be placed in the eye by means of a drop-bottle or with a camel's hair brush. A solution of silver nitrate or of protargol is most often used for this purpose.

Granular Conjunctivitis or *Trachoma* is due to a chronic inflammation of the conjunctiva which produces little granules, having the appearance of sago grains, on the lids.

The disease is met with in people accustomed to unhealthy surroundings and bad food. The eyes are bathed frequently with antiseptic lotions of a mild nature, and the general health is improved by the administration of tonics. In unhealthy and improperly fed children, a form of conjunctivitis is often seen with watering of the eyes and a dislike of any strong light. The eye is irrigated with boracic lotion and yellow ointment (Ung. Hydrarg. Oxidi Flavi) is introduced into the eye night and morning.

Corneal Ulcers.

Ulcers of the cornea vary in their degree and size. Pain, watering of the eyes, and intolerance of light, so that the eyes are kept tightly closed, are some of the symptoms.

The eye is kept at absolute rest and to relieve the pain atropine or eserine drops are used. Hot compresses, dry or wet, to the eye give some relief, and ointment is used in the later stages when the acute symptoms have subsided. The general health requires attention.

Iritis.

Inflammation of the iris may be due to injury or may be met with in rheumatism and syphilis.

There is intolerance of light, pain, and a discharge from the inflamed part which tends to adhere and bind down the iris so that it cannot move properly.

The eye is kept at absolute rest. Hot applications give relief; the pupil of the eye is kept dilated by the use of atropine. The operation of iridectomy may be done afterwards if the sight is interfered with.

Glaucoma.

Glaucoma is a disease of the eye generally met with in advanced life, between the ages of fifty and seventy. The pupil of the eye is dilated; there is marked dimness of vision, severe pain in the eye, and headache. Eserine is used in the acute stage as a palliative. The operation of iridectomy is generally performed.

Cataract.

Cataract is an opacity or loss of transparency in the crystalline lens. The most common form, *Senile Cataract*, occurs after the age of fifty. It may also be due to some injury to the lens, such as is produced by a blow or by a foreign body.

The symptoms are gradual loss of sight. As the cataract develops or ripens the sight becomes more and more dim. It may ripen in a few months or may take years. In some cases it remains stationary.

Extraction of the lens by operation is the only way of relieving the patient with senile cataract. For cataract in young people, needling or discission of the lens is the usual treatment.

Blepharitis.

Blepharitis is a common inflammatory condition of the eyelids in which crusts form on the edges. The lids are swollen and red and whitish scales are seen at the bases of the lashes. The eyelashes are apt to fall out, and there is itching, soreness, and dread of light.

The edges of the lids are washed carefully with soap and water to remove the crusts. Yellow oxide of mercury or ichthyol ointment is then applied to the lids.

The disease occurs at all ages but is more common in children, and is often a sequela of one of the specific fevers.

Burns of the Eyes.

The eyes should be irrigated with boracic lotion and castor oil dropped into them. The lids may be smeared with a little ointment to prevent them from adhering. A pad of absorbent wool and a bandage are then applied.

IRRIGATION OF THE EYE.

This may be performed by means of an Undine irrigator or a pad of sterilized wool. The lotion should be lukewarm, and should flow evenly over the eye, and not from too great a height. The nurse stands behind the patient's head which is thrown well back; a receiver is placed against the cheek and the eyelids are separated by the fingers of the left hand, the lotion flowing on to the conjunctiva.

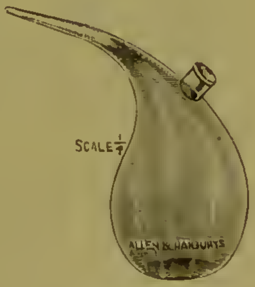

FIG. 37.—Undine Irrigator.

The solutions most commonly used for cleansing the eye are:—

Sterilized water.

Boracic acid, ½ oz. to 1 pint.

Saline.
Perchloride of mercury (1 in 10,000 to 1 in 6000).
Permanganate of potash (1 in 2000).

Boric acid is the one frequently used. It is a mild acid and has a very soothing effect.

ADMINISTRATION OF DROPS TO THE EYE.

This method is used in treating the many forms of conjunctivitis. Two or three drops of the solution are allowed to drop on the inner surface of the lower lid from an eye-dropper. The nurse stands behind the patient and, with her left hand, draws the lower eyelid downwards. Holding the dropper close to the eye, but not too close, so as to touch the eyelids, the drops are allowed to fall gently on the everted lid. The patient should then close the eyelids and move the eye about so as to diffuse the solution over the conjunctiva. Some of the remedies thus employed are zinc sulphate, tannic acid and borax.

Mydriatics, the most common of which is atropine, are administered in this way. They are drugs employed to produce dilatation of the pupil. Homatropine is a milder drug, and is very largely used.

Myotics, which diminish the size of the pupil, are used in such diseases as glaucoma and ulcers of the cornea. Eserine and pilocarpine are the two myotics in common use.

Copper Sulphate (bluestone) is used in cases of trachoma. It is generally used in the form of a pencil with a blunt rounded end; the end is rubbed across the everted lids, and the eye is afterwards irrigated with boracic lotion.

Silver nitrate is used as a disinfectant in purulent ophthalmia. A drop of a 2 per cent solution is instilled into each eye of a new-born infant, if there is any suspicion of gonorrhœal infection.

Protargol is used in solutions of from 5 to 25 per cent. It is less irritating than silver nitrate.

Argyrol has the same properties as protargol and is used in the same way.

To Apply Ointment to the Eye.

Ointment may be applied with a camel's-hair brush or on the end of a glass rod or probe. It is inserted on the everted lower lid and the eyelids are then closed so that it is spread over the conjunctiva. Yellow oxide of mercury is the ointment generally employed. It is smeared on the edge of the eyelids in blepharitis; in conjunctivitis and other conditions, it is inserted into the space between the eyelids and eyeball.

Calomel is sometimes used in the form of a fine powder; in cases of corneal ulcer, it is dusted into the eye with a camel's-hair brush.

Hot Compresses are applied by wringing pads of cotton-wool out of water at a temperature of 115° F. They are placed over the closed eye and changed every few minutes.

Cold Compresses.—A piece of wet lint, folded into four thicknesses and about one and a half inches square, is put on a piece of ice. From the ice, it is put over the closed eye and changed frequently. It is best to have a number of pieces on the ice so that they can be used in rotation. If ice is not procurable, the lint must be wrung out of cold water.

Leeches.—These are very often ordered as a means of blood-letting in cases of iritis. Two to four leeches are applied to the temple, or to the forehead. The "artificial" leech is also used, punctures being made on the skin of the temple and an ounce of blood abstracted by means of a cupping glass.

Preparation for Operations of the Eye.

The same preparation of the patient is required as for any surgical operation. An aperient is given the night before, followed by an enema on the morning of the operation. The eyelids and lashes, and the surrounding skin should be thoroughly washed with soap and water and afterwards swabbed with a weak solution of corrosive sublimate. A pad of sterilized wool soaked in boracic lotion is then applied and bandaged on lightly.

The theatre and instruments are prepared with the same aseptic precautions as for other operations. No strong antiseptics are used in eye operations, either for preparation of the part, or for the instruments used during the operation. The instruments, except fine eye knives, are boiled and placed in boracic acid lotion or placed on sterilized gauze or towels. Very good light is absolutely essential for ophthalmic operations.

The anæsthetic may be local or general. If a local anæsthetic of cocaine is used, the solution must be freshly prepared as it does not keep well.

The dressings in general use consist of a pad of sterilized gauze, used either dry or wrung out of saline solution, covered with a pad of absorbent wool and fixed by a bandage or strips of isinglass plaster. One or both eyes may be covered.

After-treatment.

The *after-treatment* of the more serious operations, such as iridectomy, is to place the patient in bed in the dorsal position, and to see that the head is kept still. It may be necessary to place sand-bags at each side of the head for this purpose. These can be taken away after twenty-four hours and the patient may then be placed on his side. The nurse must be careful to see that he is lying on the side of the unoperated upon eye. If the patient is a child, it is advisable to tie the hands to prevent any tampering with the bandages. Fluid diet is given and the patient must be fed till one eye is uncovered. The bowels need not be opened till the third day, and it is as well to caution the patient against straining. An enema may be given if necessary. On the fifth day, the sound eye is uncovered and the patient is allowed to sit up a little. At the end of a week, he may sit up in a chair for part of the day and by the tenth day is considered convalescent. Smoked glasses may be substituted for dressings at the end of a fortnight.

LECTURE VII.

NURSING OF THROAT AND EAR CASES.

Swabbing and Spraying of the Throat—Insufflation of the Larynx—To Restrain a Child for an Examination of the Throat—Gargles—Diseases of the Throat—Syringing the Ear and Instilling Liquid Remedies—Politzer's Method of Inflating the Middle Ear—Diseases of the Ear—Suppuration of the Mastoid Process—Mastoidectomy.

Nursing of Throat Cases.

Swabbing the Throat.

This treatment is ordered when it is necessary to apply antiseptics or astringents to the pharynx and tonsils. The painting may be done by a special throat brush, or better by means of a sterile swab fixed on a tonsil forceps. The tongue of the patient is depressed by means of a spatula, the swab, moistened with the pigment ordered, being then passed rapidly over the affected area. Boroglyceride is the pigment in most common use. Glycerine and tannin, and glycerine and peroxide of hydrogen are other preparations used for this purpose.

To Take a Throat Swab for Pathological Examination.

This is sometimes entrusted to the nurse in charge of the case. The sterilized swab is withdrawn carefully from the tube so that it does not touch the side of it. The patient's tongue, being depressed by means of a depressor, the swab is rubbed over the affected part so as to remove some of the exudation or membrane. Care must be taken that the swab does not touch the tongue or gums while this is being done. The swab is then replaced in the tube, and sent to the laboratory with a label attached, stating the name of patient, the ward, and the disease which is suspected. A throat swab should not be taken immediately after treating the throat with any antiseptic.

Spraying the Throat.

The spray consists of a glass bottle with a metal nozzle of variable shape, and a rubber ball with tubing attachment. To spray the throat, the nurse stands in front of the patient, but a little to one side. The mouth being well opened, the nozzle of the spray is inserted well into the patient's mouth, pointing downwards. He is then asked to inhale deeply, or to say "Ah," while the bellows is worked vigorously. This is repeated as often as is necessary. The solutions most used for spraying are boracic, tannic acid, and hydrogen peroxide.

Insufflation of the Larynx.

In laryngeal phthisis, to relieve the difficulty in swallowing, orthoform or anæsthesin, or equal parts of these powders, is insufflated into the larynx about fifteen minutes before a meal. This treatment can be done by the patient himself, if a Leduc's auto-insufflator is used.

To Restrain a Child for Examination of the Throat.

Children are frequently troublesome when it is necessary to examine their throats, or to apply pigment, or use the spray. This difficulty is overcome by one nurse taking the child on one knee, imprisoning his legs with her own, while she passes her arm round his body, pinioning his arms, the other hand being used to steady the child's head against her shoulder. The other nurse introduces the spatula, and carries out the necessary treatment.

Gargles.

A gargle is a solution of a drug for application to the back of the mouth and the throat. The patient takes a small quantity of the fluid into his mouth, throws the head well back, and then blows air through the fluid so that it comes in contact with the part affected. Chlorine water, Condy's fluid and many other solutions are used. A young child cannot gargle. Any attempt to make it do so only ends in the child swallowing a quantity of the solution. Some adults also find it impossible.

DISEASES OF THE THROAT.

Tonsillitis.—Inflammation of the tonsils occurs in diphtheria, scarlet fever, rheumatism and often arises from cold.

The tonsils, one or both, are very red and swollen; there is pain and difficulty in swallowing and the glands of the neck may swell. The temperature rises to 103° or 104° and there is furring of the tongue. The tonsil may suppurate; it is then spoken of as a *quinsy*.

An aperient should be given and the bowels kept open. Light diet and, in acute cases, fluids only will be ordered. Gargles or throat pigments are useful for the local condition. Some antipyretic may be ordered if the temperature is high.

If there is suppuration, swallowing is very painful and the respirations are noisy and difficult. The abscess may burst into the mouth giving instant relief, or it may require incising with a guarded bistoury. Inhalations of steam, impregnated with the vapour of Friar's balsam, and the application of hot fomentations to the neck give relief. Spraying the throat with a 5 per cent solution of cocaine may be ordered, if the pain is very severe.

Diphtheria.—This disease has already been described under infectious fevers.

When there is severe obstruction to the breathing in diphtheria, or in tumours of the larynx and œdema of the larynx, it may be necessary to do *Tracheotomy*. The operation consists in making an opening into the trachea and inserting a special tube. Tracheotomy tubes are made of silver usually, and have an outer and an inner tube, the one fitting closely into the other. The outer tube has a flange at each side to which is attached tape which is tied round the neck, after the tube is inserted, to keep it in place. The inner tube is movable and is taken out at frequent intervals to be cleaned.

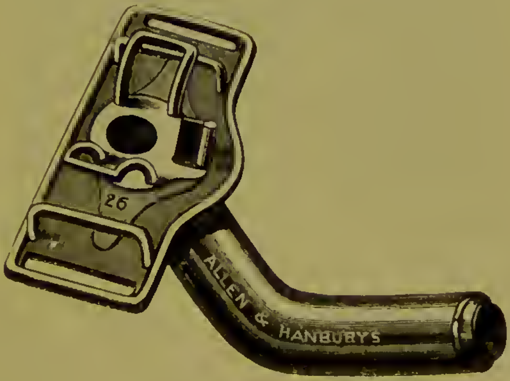

FIG. 38.—Parker's Tracheotomy Tube.

The trachea is opened either above or below the thyroid isthmus; in the former case it is called *the high operation*, in the latter, which is done if there is malignant disease of the larynx, it is termed *the low operation.*

The operation of tracheotomy is frequently one of urgency, and it is well for the nurse to know what instruments will be required so that she can have them in readiness. They should be sterilized by boiling if there is time but, if not, they may be placed in carbolic lotion 1 in 20 and afterwards put into sterile water. The instruments required are :—

One scalpel.
Two pairs scissors.
Two pairs dissecting forceps.
Two blunt hooks.
One sharp hook.
Six pairs artery forceps.
One aneurism needle.
One trachea dilator.
Tracheotomy tubes taped ready, and of different sizes.
Needles and sutures.

A roller pillow or special block is required to place behind the neck so that the parts are stretched, when the incision is made.

The dressing consists of a key-hole piece of gauze to fit under the tube, covered with a piece of jaconet cut in the same way. A double fold of gauze is placed over the opening of the tube, to filter the air and to receive any mucus or membrane that may be coughed up.

The inner tube should be taken out every two hours and cleaned with some weak antiseptic, such as Sanitas or a weak carbolic solution. It may then be washed in a solution of bicarbonate of soda before replacing it in the outer tube.

If the tracheotomy tube is coughed out, or removed accidentally, the nurse must endeavour to open the trachea by means of the dilator which should always be ready to hand. The dilator is inserted with the ends closed, they are then opened slightly and kept open till assistance can be got.

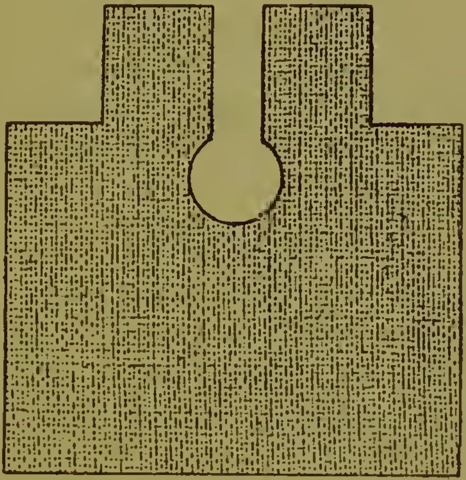

Fig. 39.—Keyhole-Dressing.

Tonsils and Adenoids.—Enlarged tonsils and adenoid vegetations are very common conditions in children. The treatment consists in removing them by operation. They are dealt with in the following lecture on out-patient work, as such cases are seldom admitted into hospital unless there is some complication.

Foreign Bodies.—Buttons, sweets, bits of toys and coins are sometimes swallowed by children, and get impacted in the pharynx or larynx, or may enter the trachea.

An attempt may be made to secure the foreign body, by hooking it with the bent finger. Failing this, the surgeon may examine the larynx with a mirror, and remove the body if it is possible by means of laryngeal forceps. If the symptoms are urgent, tracheotomy has to be performed.

NURSING OF EAR CASES.

To Syringe the Ear.

A syringe is filled with water or with the lotion ordered at a temperature of 100° F. The air having been expelled by forcing the fluid through the nozzle, the nurse stands in front of the patient's ear and pulling the ear upwards and backwards to straighten the canal, holds the nozzle of the syringe about half an inch away from the opening of the ear, and directs the fluid against the upper part of the canal, and not against the drum of the ear. There should be very little force used. After syringing the ear, the canal is dried with cotton-wool. Before the syringing is begun the patient should have a mackintosh or towel wrapped round his neck, and a receiver or a special ear-trough placed close to the neck to catch the lotion as it returns.

Syringing the ears may be ordered to remove wax, or to clear the tympanum of discharge in cases of otorrhœa. The ordinary glass syringe should be used as it can be boiled, if the case is one in which there is discharge. A brass syringe which holds about 4 ozs. is used in other cases; the nozzle should be detached and boiled before use. To loosen the wax for removal, a few drops of oil or of peroxide of hydrogen (10 per cent solution) may be dropped into the ear, and the canal afterwards irrigated with warm water.

To put Liquid Remedies into the Ear.

The ear should first be thoroughly syringed and dried. The fluid to be used is placed in a test tube and heated by placing in a bowl of water at a temperature of 105° F. The patient's head is laid with the affected ear uppermost, the fluid is run in and allowed to remain in the canal for several minutes. To remove the fluid, the head is bent to the affected side, and it then trickles out, or some absorbent wool may be placed in the meatus.

Insufflation into the Ear.

Powders may be introduced by placing them in a small glass tube to which is attached a piece of rubber tubing. By blowing through the tubing, the powder is blown into the ear. In hospital, special insufflators are used.

To Inflate the Middle Ear.

For examination of the ear, it is necessary to inflate the middle ear, i.e. to drive air through the Eustachian tube into the tympanum. This inflation is performed in different ways, but *Politzer's method* is one of those most commonly employed. This method is carried out by a Politzer's bag, the nozzle of which has a piece of tubing covering it which should be changed for each patient. The nozzle is inserted into one of the patient's nostrils, and both nostrils are then occluded by the finger and thumb of the surgeon's left hand, while, with the right hand, he holds the bag. The patient who has previously taken a little water into his mouth is told to swallow, and the moment he does so, the bag is forcibly squeezed. Holt's modification of this consists in the patient puffing out his cheeks, the lips being kept firmly closed, while the bag is compressed.

DISEASES OF THE EAR.

Earache or pain may be slight or very severe. In middle-ear disease it is intermittent in character, and is generally worse at night. Coughing, blowing the nose or sneezing increases the feeling of discomfort. When there is pain and tenderness over the mastoid, it may point to inflammation in the antrum.

Tinnitus aurium or subjective noises in the ear, is often a very persistent symptom of ear disease. The sounds vary in character but are generally described by the patients as ringing, singing or like the sound of running water. The condition is met with in kidney and heart disease and in anæmia. Quinine and salicylates and other drugs also produce tinnitus.

Vertigo is a less common symptom of ear disease. It is sometimes produced by the pressure of wax against the drum membrane, or by syringing of the ear. The giddiness may be experienced only when stooping, or with any sudden movement of the head; or it may come on suddenly and be accompanied by nausea and vomiting and other acute symptoms.

Otorrhœa or discharge from the ear is usually of middle-ear origin. It may be muco-purulent or purulent, and the discharge from chronic middle-ear disease is very offensive and characteristic. The ear is syringed frequently with an antiseptic lotion such as boracic, after which 10 to 15 drops of a 10 per cent solution of peroxide of hydrogen are instilled and allowed to remain for five minutes. The ear is then dried with sterile wool and inflated by Politzer's method after which it is again dried with a piece of sterile wool. This treatment is repeated from one to three times a day as ordered.

Acute otitis media, or acute inflammation of the middle ear, may be divided into two forms, a mild form when there is no perforation and a severe form with perforation.

Pain, which is worse at night, is one of the first symptoms and there is tenderness over the mastoid process. The temperature generally rises, especially in children. Tinnitus of a throbbing character is often complained of. If the inflammation goes on, the membrane gives way and the pus is discharged rather abundantly at first, and then gradually diminishes in favourable cases.

The treatment consists in keeping the patient in bed, giving some aperient to clear the bowel, and endeavouring to relieve the pain in the ear by some sedative. Dry heat may be applied.

In severe cases, when there is danger of perforation, paracentesis of the drum of the ear may be performed by the surgeon.

Inflammation and Suppuration of the Mastoid Antrum. In the course of chronic middle-ear disease, there may be complications; such as inflammation and suppuration of the mastoid process.

The symptoms of suppuration are pain behind the ear, tenderness on pressure, vertigo and vomiting. There may be redness and swelling over the mastoid process.

Two forms of operation are employed for mastoid disease. For acute mastoid disease, an opening is made into the mastoid antrum, the cavity being irrigated and packed with sterilized gauze. This operation is known as *mastoidectomy*.

The Radical Cure or *Stäcke's Operation* is performed if the suppuration is a complication of chronic middle-ear disease. In preparing a patient for this operation, the hair must be shaved off the side of the head for an area of about 2 inches all round the ear. If there is any question of a cerebral abscess, half the head should be shaved. The area is then made surgically clean in the usual way. The patient is prepared as for any other operation.

The after-treatment of both operations is the same. The patient is kept very quiet. The post-operative vomiting is often troublesome and the patient is, as a rule, very drowsy at first. The acute cases are dressed on the day after the operation, the ear and wound being irrigated, a drain, either of rubber or plugging, inserted and the part re-dressed.

After Stäcke's operation, the wound may not be dressed till the second day. The wound is kept as dry as possible. Skin-grafting has generally to be done if the healing process is very slow.

The nurse must watch for the onset of complications after a mastoid operation. *Facial paralysis* may occur before the operation is performed or after. The paralysis may be partial or complete, and, though it cannot be cured, electrical treatment gives good results.

Meningitis is another complication. It is shown by pain, headache, photophobia and irritability. Vomiting occurs, and there is great restlessness. The patient cries out or talks incoherently. There is hyperpyrexia and the muscles of the back become rigid. In children convulsions are common; meningitis in such cases is very fatal.

Cerebral Abscess is also to be feared. The symptoms in the first stages are indefinite, but a subnormal temperature with a pulse, first quick, and then abnormally slow, accompanied by vomiting and a condition of drowsiness, are symptoms which point to some compression of the brain, and should be reported at once.

LECTURE VIII.

GYNÆCOLOGICAL NURSING.

Preparation of patient for examination—Position of the Patient—Treatment of Minor Gynæcological Cases—Preparation of Patient for Operation—Chief Minor and Major Operations—After-treatment of Abdominal Sections—Complications.

1. Preparation of a Patient for Examination.

If a patient is supposed to be suffering from a disease of a gynæcological nature, the doctor will examine the chest and abdomen externally, also the vulva, and will make an internal examination of the vagina, uterus, and other pelvic organs. Attention must be given to the bowels in the latter case, to ensure that the lower bowel is empty. If there is time, an aperient must be given previous to the examination, followed, if necessary, by an enema, as any mass of fæces in the lower bowel makes the examination more difficult.

The bladder should be emptied naturally. It is seldom necessary to pass a catheter in these cases. The clothing of the patient is arranged suitably. If she is in bed, the nightgown is drawn up as far as the breasts, and the lower parts covered with the sheet only, which is placed so that it comes up over the pubes. If the examination is made with the patient out of bed, the corsets and skirt should be removed, and the strings and fastenings of the underclothing undone. If combinations are worn, they must be unbuttoned. A woman is not examined during the period of menstruation, but, if there is profuse discharge or hæmorrhage, an examination may be necessary even at such a time. The nurse should be careful that the patient is quite clean before such an examination is made. Some lubricant and swabs of wool must be provided, and, if the case is a septic one, a pair of sterilized rubber gloves should be at hand for the surgeon's use.

2. The Position of the Patient.

(*a*) The *Dorsal Position* is the usual one for the examination of the abdomen and breasts. The patient lies flat on her back with her head and shoulders slightly raised. The knees are drawn up a little so as to relax the abdominal muscles.

(*b*) The *Lateral Position.*—This position is used for examination of the vulva, introduction of pessaries, and for minor treatment to the vagina. The patient lies on her left side with the knees drawn up as far as possible, the buttocks projecting over the edge of the bed. The bedclothes are turned up at the side and the nightdress is drawn up over the hips so as to expose the vulva.

(*c*) *Semi-prone Position*, sometimes called *Sims's position*, is a modification of the lateral position. The patient lies well over on her left side, with her breast and face on the pillow, the left arm hanging behind her over the edge of the bed. The knees are drawn up, the right being drawn up higher than the left and lying a little in front of it. This position is useful when the doctor wishes to use Sims's speculum.

(*d*) *Genu-pectoral Position.*—This position is seldom required. The patient is placed kneeling on the bed with her breasts resting on the pillow.

(*e*) *Gynæcological Position.*—This position requires a special couch or chair, to which are attached extension brackets for the patient's feet. The same position may be gained by placing the patient across the bed with the buttocks at the edge and the feet resting on a couple of chairs.

Lithotomy Position is the one used for operations and is employed only when the patient is under an anæsthetic. The patient is placed in the dorsal position and moved down so that the buttocks are resting a little over the end of the table. The thighs are flexed on the trunk, and the legs on the thighs, and she is kept in this position by strapping the feet to the uprights at the end of the table, or by applying a Clover's crutch.

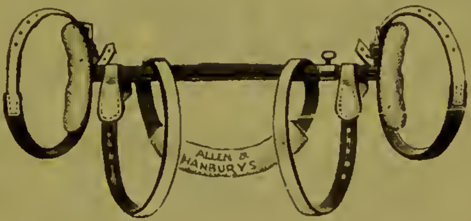

FIG. 40.—Clover's Crutch.

The *Trendelenburg Position*, so called after the surgeon who suggested it, is the position used in abdominal operations on the pelvic organs. The advantage of this position is that the intestines fall back towards the diaphragm, leaving the pelvic organs more exposed. Operating tables are made so as to tilt into this position, the patient's knees, in the Trendelenburg position, being the highest point and the head the lowest.

TREATMENT OF MINOR GYNÆCOLOGICAL CASES.

1. *Douching.*—The method of giving a vaginal douche has already been described (Lecture V to First Year Probationers). The temperature of an ordinary douche should be about 105° F.

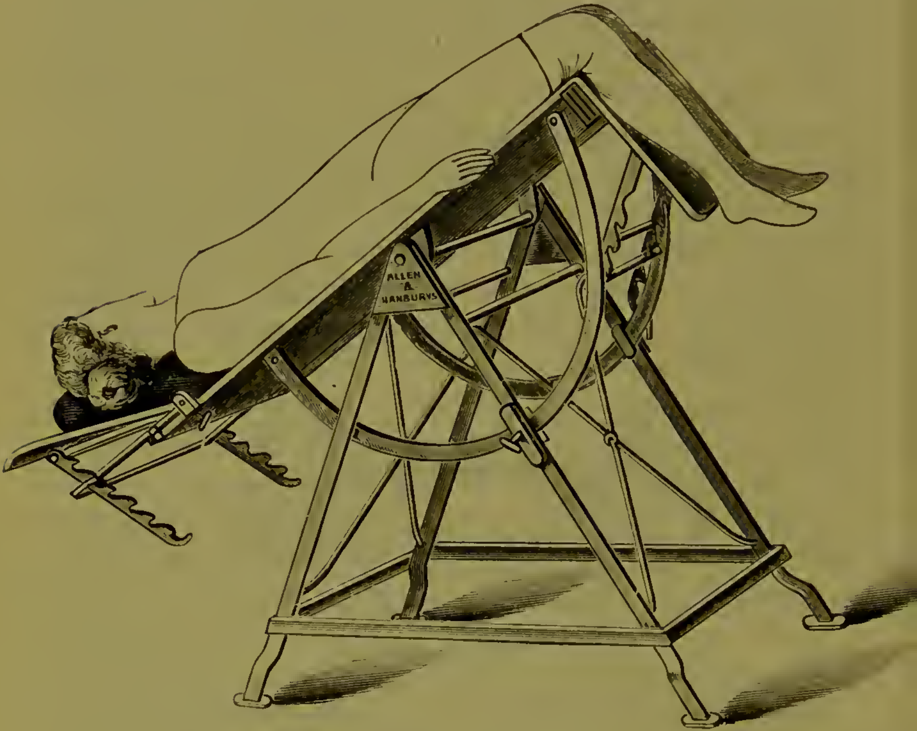

FIG. 41.—Table in Trendelenburg Position.

If a hot douche is ordered, it should be administered at a temperature of 115° F. A douche at a temperature of 120° F. is about as hot as can be borne, and is useful for arresting uterine hæmorrhage. One of the best antiseptic douches is biniodide of mercury (1 in 4000). Lysol is also frequently used in the strength of ½ to 1 drachm to a pint of water.

2. *Use of the Catheter.*—See Lecture V to First Year Probationers.

3. *Tampons.*—A tampon is a plug of cotton-wool about the size of a hen's egg tied round with a piece of thread or tape by which it can be removed. Tampons are used to plug the vagina when there is hæmorrhage, to absorb any vaginal discharge, and to support the walls of the vagina in cases of prolapse. They may be impregnated with any solution ordered and are then used in inflammatory conditions. If packing the vagina is done for hæmorrhage, a nurse should not remove the plugging without definite orders to do so.

A douche should be given before introducing a tampon, which is passed well up into the vagina. This is generally done at night, the tampon being removed in the morning, and another douche then given. Glycerine is largely used in medicated tampons. The tampon must be soaked in it for some time before use. The tampon is inserted by placing the first and second fingers of the left hand in the vagina, separating the labia and placing the tampon in the vagina with the right hand, pushing it up as far as possible with the index finger. A pad of wool or a diaper should be worn, as the secretion caused by the tampon is often profuse.

Vaginal suppositories.—These are similar to the rectal suppository but are larger. They consist of cacao butter impregnated with a sedative or antiseptic drug. They should be lubricated, and passed well into the vagina. A pad of wool or a diaper should be worn afterwards.

Pessaries are used in the treatment of displacements of the uterus. Backward displacements are relieved by inserting a *Hodge's pessary* which is made of vulcanite, rubber, or block tin. *The Ring pessary* is used for prolapse of the uterus. The *rubber stem-pessary* is used in the treatment of complete prolapse of the uterus, and some surgeons use the *intra-uterine glass stem* for acute anteflexion. A patient who has to wear a pessary requires regular douching in order to keep the parts clean.

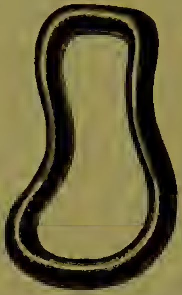

FIG. 42.—Hodge's Pessary.

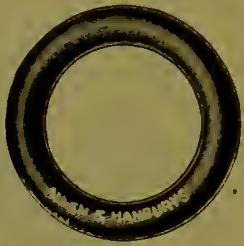

FIG. 43.—Ring Pessary.

Plugging the Vagina for Hæmorrhage.—In cases of uterine or vaginal hæmorrhage, a hot douche is given, and tampons dipped in biniodide of mercury (1 in 4000) are then packed into the vagina until the cavity is filled up. They should be well packed round the cervix, and the vagina then completely filled with them, the tapes being left outside to facilitate removal.

PREPARATION OF THE PATIENT FOR OPERATION.

The general preparation of the patient for any gynæcological operation is the same as that already described in Lecture X to Second Year Nurses. It includes the keeping of a chart, showing the daily temperature, and the pulse and respiration rate, the care of the mouth and general cleanliness, attention to diet, testing of urine and attention to the bowels. The special preparations will include douching, shaving, and surgical cleanliness of the skin over the operation area. It is usual, in the operations of vaginal and abdominal hysterectomy, to pass a catheter before the operation to make quite sure that all the urine is drawn off. If the bowels have been regulated for some days before, an enema given a few hours previous to the operation will be sufficient, or a dose of castor oil is given the evening before, followed in the morning by a soap-and-water enema. For vaginal operations, the preparation of the abdomen is not necessary, but it is advisable to shave the labia and perineum, and the vulva and perineum are prepared with spirit and iodine. Douching should be done three times a day before a vaginal operation, and, as a rule, a douche is given in the theatre before the operation is begun.

The usual care is taken as to the administration of a cup of beef-tea four or five hours before the time fixed for the operation. The clothing should be suitable and warm, and the legs should be covered with long white woollen stockings coming right up on the thighs.

The *operations* met with in gynæcological work are divided into *minor* and *major*.

The minor include :—

Dilatation and Curetting, when the uterine canal is dilated in the treatment of dysmenorrhœa, or may be dilated in order to curette or scrape the uterine cavity. Douching is done before this operation, and douches may be required at the beginning and end of the operation. Playfair's probes, dressed with wool, are used to apply some solution, such as iodized phenol, to the uterine cavity. Tampons or strips of sterilized gauze may be inserted in the vagina. They are removed the next morning.

Colporrhaphy.—This operation is performed when the vaginal walls are relaxed. They are shortened by dissecting off a part of the mucous membrane and bringing the cut edges together. The vagina is packed with gauze, and a pad of wool applied to the vulva and fixed with a T bandage. Douches may be ordered, but the practice varies with different surgeons.

Trachelorrhaphy and Amputation of the Cervix.—The first operation is done to repair the cervix, if it has been torn during labour. Amputation is sometimes necessary, when there is hypertrophy of the cervix. The dressings are the same as for operations on the vagina, and douching is necessary.

Perineorrhaphy means the repair of the perineum. It may get torn or stretched during labour. The rupture may be complete, that is it reaches into the rectum, or it may be partial, not extending so far as the rectum. Prior to the operation, it is usual to give a strong aperient such as castor oil two nights before, so that the bowel is thoroughly well emptied. On the night before, a large soap-and-water enema is administered and repeated the next morning.

After the operation, to avoid the area of operation getting soiled with urine, the catheter is usually passed every eight hours for the first two days. Some surgeons prefer their patients to pass urine naturally, kneeling up in the bed to do so. An aperient, generally castor oil, is given on the evening of the day following the operation, and the bowels are kept well open. No enema should be given for the first four days after operation if the rupture has been a complete one. Douching is sometimes ordered. The usual dressing consists of a strip of sterilized gauze which is placed in the vagina ; pads of gauze are placed on each side of the stitches, covered with a pad of absorbent wool, the whole kept in place by a T bandage. The patient must be kept as quiet as possible and should not move the legs too much. She is generally most comfortable lying on the side, owing to swelling and tenderness of the parts. Liquid diet is given until the bowels have been well opened, so the feeding depends on the day on which the aperient is given. Care must be taken to keep the parts quite clean and dry. After any action of the bowels or bladder, the perineum is sponged carefully with a mild antiseptic lotion and dried to prevent sepsis.

Operation for Vesico-Vaginal Fistula.—If the vagina is injured in labour, there may be a communication between it and the bladder. The operation is done to obliterate this communication. In some cases a self-retaining catheter is left in the bladder, to allow the urine to flow from the bladder as fast as it is collected there.

Removal of Bartholinian Cysts.—These cysts occur in the lower end of the labium majus.

Operation for Urethral Caruncle.—This is a small vascular growth at the entrance of the urethra. It is either dissected off or cauterized.

Vaginal Myomectomy.—This is the removal of a fibroid from the interior of the uterus per vaginam.

Vaginal Hysterectomy.—This operation is not so common now, abdominal hysterectomy having taken its place. The nursing is similar to that of an abdominal section.

The major operations include: Abdominal hysterectomy ovariotomy, myomectomy, salpingectomy, salpingo-öophorectomy, Wertheim's operation, Cæsarean section, hysteropexy, Alexander's operation and exploratory coeliotomy.

Hysterectomy means the removal of the uterus. The complete removal of the uterus, ovaries and Fallopian tubes is sometimes necessary, if there is malignant disease. This is known as total extirpation or pan-hysterectomy.

Ovariotomy is the removal of a tumour or cyst of the ovary.

Myomectomy is the removal of a fibroid tumour from the uterus, without removing the uterus itself.

Salpingo-öophorectomy means the removal of the ovary and the Fallopian tubes on one or both sides. It is done in cases of pyo-salpinx and for extra-uterine pregnancy.

Salpingectomy is removal of a Fallopian tube.

Wertheim's operation is done in cases of cancer of the cervix; the uterus, ovaries, tubes and upper part of the vagina are removed and enlarged lympathic glands from the peritoneum.

Cæsarean Section is done when there is some condition, such as contraction of the pelvic bones, which prevents the birth of a child in the usual way. The child is removed from the womb through an abdominal incision.

Hysteropexy is an operation for sewing up the uterus to the abdominal wall. It is done for displacement and prolapse.

Alexander's operation for shortening the round ligaments is done for cases of backward displacement of the uterus.

Exploratory Coeliotomy is a term used to indicate that the abdominal cavity has been opened. The term *laparotomy* is sometimes used in the same way.

The after-treatment in all these major operations is carried out in the same way. The patient is placed on her back, with a pillow placed below the knees to prevent any strain on the abdominal muscles, and a cradle, if necessary, is placed over the abdomen. On the day after operation, she may be raised into Fowler's position. If shock is present, saline by rectum is usually administered, provided there is no hæmorrhage. One pint or more may be given. Sometimes flatulence is very troublesome. This may be relieved by passing the rectal tube about ten hours after operation, and every four hours subsequently, if it is found necessary. In very obstinate cases a rue enema is useful. The vomiting caused by the anæsthetic is sometimes very persistent. Sodium bicarbonate (10 grains) given in water may check it. The feeding has to be done carefully, and a note kept of the amount the patient takes. If there is no sickness, a little water, hot or cold, may be given in ounce doses about four hours after operation and continued hourly. On the second day, a little milky tea twice in the day, and milk and water are given two hourly, one ounce of milk and an ounce of water to begin with, and gradually increased. On the fourth day, the patient may have a little bread and butter without crust and for dinner a boiled sole and custard pudding. The following day, a boiled egg may be added for breakfast, and the fish may be boiled or fried. The sixth day's diet may consist of chicken and milk pudding, and this light diet is continued for a week, after which, ordinary diet is given.

The catheter is passed six hours after operation, if the patient has been unable to pass urine naturally. The bladder must on no account be allowed to become distended. A dose of castor oil is given on the second night after operation, followed by a soap-and-water enema; or, on the morning of the fourth day following the operation, 4 ozs. of warm olive oil may be injected into the bowel, and a soap-and-water enema given about four hours later. The patient will require some aperient at regular intervals during the remainder of the time in bed.

The pulse, respiration, and temperature are recorded every four hours for the first seven days and twice a day afterwards.

The dressing should not require changing till the seventh day, when the stitches are taken out, but the nurse must see that the dressings are kept in place and not allowed to ride up, leaving the wound uncovered.

If the case is satisfactory, the patient is able to get on to a couch for an hour or two on the fifteenth day, and by the end of a month is well enough to go home.

The complications likely to arise in nursing such cases are:—Vomiting, distension, shock, hæmorrhage, sepsis, thrombosis and pulmonary embolism.

1. *Vomiting.*—This may be due to the anæsthetic, but, if very persistent, may indicate sepsis or obstruction.

2. *Distension* is common during the first twenty-four hours, and is treated by the application of the rectal tube or the administration of a turpentine enema. If no flatus is passed by the end of the second or third day, it may indicate the onset of sepsis or of intestinal obstruction.

3. *Shock and Hæmorrhage* are sometimes confounded as the symptoms are somewhat similar. In shock, the patient is quiet, whereas, if there is bleeding, there is great restlessness; the breathing in the former is quick and shallow, while in the latter it is sighing and gasping; shock produces a semicomatose condition, in hæmorrhage, the patient is fully conscious.

For shock warmth and stimulants are essential. In such a case, hot-water bottles are packed round the patient, the head is kept low and the foot of the bed raised. Rectal injections of saline, to which an ounce of brandy may be added, are of service in combating this condition. The surgeon may order hypodermic injections of ergotinine citrate or of pituitary extract.

The signs of internal hæmorrhage have been described under Hæmorrhage (Lecture XI to First Year Probationers). No stimulants must be given. The foot of the bed should be raised, and the patient reassured and kept quiet. The necessary preparations for reopening the abdomen and securing the bleeding point must be made at once.

4. *Sepsis* may be the result of the operation, or may be due to some condition present before operation. The first indication may be a rise of temperature, or a rigor with a subsequent rise of temperature during the twenty-four hours following the operation. The pulse is very rapid and bounding, the tongue dry and brown. There is vomiting of a dark green or brown colour, and the vomit is brought up in large quantities ; the abdomen is distended, the walls are rigid, and there is much pain. The condition is treated by placing the patient in a sitting-up position (Fowler's), the abdomen is drained and saline injections are given by rectum. Calomel is, as a rule, given in small doses frequently and the patient's strength is kept up by administration of stimulants.

5. *Thrombosis.*—The patient complains of pain in the leg, which becomes swollen and tense. The temperature may be high. The affected limb must be slightly raised on a pillow, and should be wrapped in wool. It may be painted with glycerine and belladonna. A cradle is placed over it and sand-bags at each side to ensure that there is no movement, as there is danger of the clot getting into the circulation and being carried to the heart.

6. *Pulmonary Embolism.*—This is a condition which may come on a week or ten days after operation. A clot of blood has become detached from a thrombus and has reached the lungs, blocking a vessel.

The patient is seized with sudden dyspnœa, and pain in the chest. The face becomes grey and livid, and she sits up in bed struggling for breath. There is very little the nurse can do. Oxygen should be given to inhale, and brandy may be administered. Morphia is helpful.

LECTURE IX.

THE OUT-PATIENT DEPARTMENT.

Some Duties of a Nurse—Minor operations—Tonsils and Adenoids—Phimosis.

During the nurse's period of training, she will probably spend some time in the out-patient department of the hospital.

In a training school, this department is generally under the management of a sister with a varying number of nurses to assist her.

The Nurse's Duties.

It is impossible to give any detailed list of the duties of the nurse in this branch of work. The duties are multifarious and varied. She is there to assist the doctors in any way they may require.

The duties include:—

1. The arrangement of the order in which the patients will see the different physicians and surgeons. New cases are, as a rule, seen first, any urgent case being attended to at once. The nurse must use her own judgment in deciding this.

2. Daily dressings and other treatment are done by the nurse. Anything unusual is of course kept for the surgeon's inspection.

Minor casualties, such as superficial burns or scalds, abrasions or cuts may be dressed by her, and she may even be required to put a few stitches in a wound such as one of the scalp.

3. The nurse prepares all the instruments and apparatus required by the medical men for their examination of patients. She must see that they are all in perfect working order.

4. She must instruct the patients about undressing as far as is necessary to make the examination possible. In gynæcological work, it is necessary for the woman who is to be examined to remove her corsets and drawers and to loosen any strings.

5. The nurse may be asked to procure a specimen of urine from a patient, to give a soap-and-water enema, to pass a catheter, to prepare for a lumbar puncture and to do many other points of practical nursing.

6. When the patient is a woman, a nurse remains in attendance during any examination the doctor may make. If the patient is a child, she will be required to restrain it, while the physician or surgeon carries out his examination.

7. In the special departments, such as those for X-rays and light-treatment, the nurse will have special duties. These will be shown her by the specialist in attendance.

8. The nurse will prepare for and assist in the minor operations performed in the out-patient department, and take charge of the patients thus operated on till they are able to go home.

The operations most frequently done in an out-patient department are the *Removal of Tonsils and Adenoids*, *and Circumcision.*

1. Enlarged Tonsils and Adenoid Growths.

These two conditions often exist together. The tonsils are very enlarged, sometimes projecting to such an extent that they meet in the middle line. Swallowing is made very difficult, and sickness and vomiting are common symptoms. Adenoids are fleshy masses which grow in the naso-pharynx. They may be in such numbers as to block the passage between the nose and the pharynx.

The child with adenoids shows typical signs. There is so much interference with the breathing that the child breathes through the mouth, and is often spoken of as a "mouth-breather"; he is liable to colds and sore throat; he snores in his sleep and is often a victim of "night terrors". Nose-bleeding, deafness and earache are other symptoms frequently met with. The mouth is kept constantly open, the face appears long, the nose is flattened and there is a markedly vacant expression. The use of a comforter in infancy is said to favour the growth of adenoids.

Operative treatment is the only satisfactory one. The mother is told to bring the child to the out-patient department on a certain day, and to prepare the child for operation, written instructions being given as to how this should be done, viz.—

1. To give a dose of castor oil in the afternoon of the day before.

2. To give nothing to eat or drink on the morning of the operation.

3. To bring a clean towel, and a clean shawl or wrap, to put round the child's mouth when it is being taken home after the operation.

The nurse will prepare the following instruments for the operation.

One mouth gag.
One tongue depressor.
One tongue forceps.
One tonsil guillotine.
Two adenoid curettes.
One lateral ring knife.
Three sponge-holders.

A howl of iced water should be at hand. For the operation a general anæsthetic is given ; ethyl chloride is one of the safest.

A mackintosh cap is put on to cover the child's head, coming well over the ears to keep the hair clean, and a sterilized towel is pinned over this. When under the anæsthetic, the child's head is placed so as to be over the end of the table.

When the operation is over, the child may be turned over on its face, so that any blood collected in the mouth may escape. He is then placed in a sitting-up position, which is of assistance in checking the bleeding.

No after-treatment is, as a rule, necessary. The child is placed in the recovery room for two hours before being sent home, and the nurse should see that his head is kept low ; if vomiting occurs the jaw should be pushed forward. He should not be allowed to leave hospital till the bleeding has quite ceased. The mother may be warned that the child may vomit some dark-coloured blood, so that she is not needlessly alarmed. If bright blood comes after she gets home, it is well to tell her to sit the child upright, and if the bleeding does not stop to send for a doctor. Her written instructions will tell her to put the child to bed as soon as she returns home and to keep it there for three days ; to give nothing but boiled milk and water during that time, and to wash the mouth out with some boiled water with a little Condy's fluid in it after each drink.

On the third or fourth day, soft foods may be given. A purgative is to be given on the second night after the operation. The child is generally brought up to hospital at the end of the week to see the surgeon, and, if the condition is unsatisfactory, should be brought at once.

Breathing exercises should be taught as the child has lost the art of breathing through the nose.

The two complications likely to arise are bleeding and sepsis.

The former generally takes place before the child leaves the hospital. Ice-compresses are applied over the back of the neck and to the throat. Ice may be given to suck. In very severe cases, the surgeon may swab the throat with adrenalin.

Sepsis seldom occurs, and is generally due to some condition of the child rather than the operation. The throat will be gargled or swabbed with some disinfectant.

PHIMOSIS.

This is the most common malformation of the penis, and is a condition in which the prepuce cannot be retracted over the glans, because its orifice is too small. Phimosis may be congenital or acquired. During childhood, there is difficulty in passing urine, or it may constantly dribble away. Nocturnal incontinence is sometimes caused by this condition.

If these symptoms exist, it is well to recommend operation. The operation of circumcision is a slight one, and the child is able to return home an hour or two afterwards.

The mother is told to prepare the child as described for the operation for adenoids, and, in place of the clean towel, to bring a clean napkin to put on the child after operation. A dressing of gauze and collodion or gauze and strapping may be applied, or an ointment dressing of boracic or hazeline cream. The child must be kept as clean as possible, and the dressing changed every time he passes urine. At the end of a week, he is brought to hospital to see the surgeon and, if necessary, the sutures are then removed. As a rule, catgut sutures are now employed and, as they are absorbed by the tissues, no removal is necessary. If at all anxious about the condition of the child, the mother should bring him to see the surgeon at an earlier date.

Hæmorrhage, retention of urine and sepsis are the complications to be feared, but none of them are of common occurrence. Bleeding is stopped by pressure of a ligature; retention of urine by the use of hot baths. Fomentations are ordered if there is sepsis, but, with care taken to keep the part clean, this complication can generally be prevented.

LECTURE X.

ELECTRICITY AND MASSAGE.

Galvanism and Faradism—The Electric Bath—High Frequency Currents—Electrolysis—Finsen Light and X-Rays—Radium—Massage—Uses and Movements—Weir-Mitchell Treatment for Neurasthenia.

It is impossible in a short lecture to go fully into these two subjects. They are branches of nursing which require special study and actual experience. An endeavour has been made to touch upon the more important points, so that the nurse may take an intelligent interest when such treatment is ordered for her patients.

Electricity is now very much used in the treatment of diseases, both medical and surgical. At one time, it was used mainly as a stimulant, being applied locally to paralysed muscles; at the present time, its uses are many—to alleviate pain in neuralgic cases, to test muscle and nerve reactions, and to generate heat and light for different purposes. It is also used for electrolysis.

The two chief kinds of current electricity are known as the "*Faradic*" and the "*Galvanic*".

The *Faradic* or *Interrupted* currents are made and broken in rapid succession from 50 to 100 times a second. The strength of the current is regulated, and its direction is constantly changing.

The *Galvanic* or *Continuous* currents flow always in the same direction from the positive to the negative pole.

A third called the *sinusoidal* current is used for electric baths. It is similar to the faradic, but it is gentler, and does not cause pain even when strong currents are used.

By *Galvanism*, a continuous current of electricity is obtained, which can be graduated, and so made to be stimulative or sedative. This current is obtained from a galvanic cell, but one cell would not be strong enough to act on a patient, so several are joined together to get a strong enough current, and the collection, which may number from eighteen to thirty, is called a galvanic battery. The wires extending from the battery to the patient are called rheophores; they are covered with some insulating material such as silk or cotton. Attached to those wires are the electrodes, which are pads made of lead, tin, or pewter covered with wash-leather or flannel. They vary in size and shape. The active electrode or pad is the one to be used on the affected part; the indifferent pad is always larger than the active one, and is simply used to complete the electric circle. It is placed at the back or on the abdomen or on the soles of both feet. When giving a sitting for a direct current of electricity, the patient is placed on a convenient chair or couch. This is protected by waterproof cloths or bath towels. The patient's clothing is removed sufficiently to reach the part to be treated. The pads are wetted with a solution of salt, in the strength of one teaspoonful to a pint of water, because the skin is a bad conductor. The patient's skin is also swabbed with this solution. The small pads are used for superficial parts, but larger ones are employed, when the deeper structures are treated. The patient must be watched all the time the current is on, as it may have to be regulated. The usual length of application is from ten to fifteen minutes.

The *Electric Bath* is used when it is desired to administer electricity to the entire body, or to a large area in diseases, such as hemiplegia, infantile paralysis and gout. The electrodes, two or three in number, are placed in an ordinary earthenware or porcelain bath, one at the head, another at the foot, and the third about the middle of the bath. The bath is filled with water at a temperature of 99° F. to a depth sufficient to cover the shoulders, and the patient rests on a back-rest with webbing straps, placed well away from the electrode. The patient gets into the bath before the current is turned on, and may stay from ten to twenty minutes in it. Care must be taken to turn the current off gradually. Local baths for the upper or lower extremities are given in the same way in special baths made for the purpose.

The *High Frequency Currents* are used for rheumatism, gout, and pulmonary tuberculosis, also in diseases of the skin, especially acne, psoriasis and lupus vulgaris. It is applied in the direct way by means of the two electrodes as in faradism. For condensation, the patient lies on a couch, one electrode being attached to a large metal plate lining the back of the couch and the other held in the patient's hand. Special insulated cushions, covering the couch, protect the patient from contact with the electrode below. Special forms of electrodes are used for local applications. They are moistened with water before applying. A little salt may be added to the water for administering constant current, but the nurse must never use salt in a total immersion bath.

Electrolysis is used for the removal of nævi and superfluous hairs. It is also employed to introduce drugs through the skin to the affected part, when it is known as the *Ionic treatment* or *Cataphoresis*.

The *Finsen-Light treatment* is much used in the treatment of lupus. In Finsen's lamp, a very powerful arc light is used, which has four telescopes attached to it radiating in four different directions. The light is focussed by means of these telescopes which have convex lenses made of rock-salt or quartz-crystal. Water circulates between the lenses in the telescope to absorb the heat rays as much as is possible. The nurse, when administering this treatment, must wear special dark glasses made for the purpose, as neglect of this leads to serious eye trouble.

The original Finsen lamps are very expensive. The *Finsen-Reyn Electric Arc Lamp* is now extensively used. It has a smaller arc lamp, and has only one telescope. The method of using is the same.

X-Rays, or Roentgen Rays, are generated by passing an electric current from an induction coil through a glass tube from which nearly all the air has been sucked out. These tubes are large and brittle, and require careful handling, as they are very expensive.

If a nurse has to hold a patient while X-rays are being administered, special gloves should be worn. For examination of the kidney by X-rays, it is necessary to prepare the patient by purgatives and an enema. X-rays are used in the treatment of many diseases, and are very successful as a cure for ringworm. They are employed in obtaining photographic pictures of the bones and viscera.

RADIUM TREATMENT.

The nurse has little to do with this treatment. The radium is sent out enclosed in minute tubes of silver or gold. These tubes are not placed on the patient's skin but are kept at a distance from it, being separated from it by several layers of lint. In a wound, a piece of gutta-percha tissue is first put on, then layers of lint, upon which the tubes are placed and fixed by means of sticking plaster. The whole is then bandaged on. The length of time the radium is to be kept on is ordered by the doctor. It may be from four to twelve hours, or it may be used for two hours every day for a short period. The nurse must see that the dressing is not interfered with, and the tubes lost. The tubes may be cleaned very carefully with a piece of cotton-wool wrung out of soapy water—and then wiped with spirit. They must never be allowed to get wet by placing in water.

MASSAGE.

Massage is the skilled manipulation of the human body in a passive state. It is a term derived from the Greek word meaning to knead or handle and is popularly spoken of as "rubbing". It was brought into prominence by the Swedes about 120 years ago, but it is of much greater antiquity. The Greeks and Romans were massaged as part of their daily toilet.

It is used in the palliation or cure of many affections and it is very necessary for its proper use that the masseuse should have a thorough knowledge of the muscles of the body, their origin and insertion, of the nervous system, and of the general circulation.

Massage Has Seven Uses.

1. To relieve pain and congestion.
2. To increase circulation in a diseased part and to regulate it generally.

3. To improve nutrition locally and generally.

4. To remove exudations, extravasations and adhesions.

5. To stimulate the activity of the organs and to restore the movement of joints.

6. To strengthen the muscular system.

7. To give tone to the nervous system.

Massage Movements.

1. *Effleurage.*—A slow, firm stroking, with one or both hands, from the extremity upwards.

It is used to relieve pain and congestion; to soothe the nervous system, as in insomnia, and to further the circulation and the absorption of inflammatory and other products, as in sprains and fractures.

2. *Kneading or Pétrissage.*—Is picking up of the muscle off the bone combined with a rolling and pressing movement. It may be done with both hands grasping the whole limb, to remove extraneous matters from the muscles in cases of rheumatism and heart disease; or between the heel of the hand and the fingers, used for nutrition of atrophied muscles; kneading of the abdomen is done with the heel of the hand; its object is to increase the functions and secretions of the organs, and to increase the activity of the colon and the abdominal circulation generally.

3. *Frictions.*—A rubbing movement done with the thumbs or the three middle fingers down the course of a nerve with slight or deep pressure, or it may be done in small circular movements with more pressure.

It is used to promote the absorption of exudations, and to stimulate or soothe the nerves.

4. *Tapôtement or Percussions.*—These movements are used to stimulate the muscles and nerves. They are :—

(*a*) *Pounding* with the loosely clenched hand to stimulate the muscles of the back and thigh.

(*b*) *Hacking* with the ulnar border of the hands, working alternately, for stimulation of the superficial nerves and muscles.

(*c*) *Beating*, a downward stroke with the loosely clenched hand, the wrist remaining loose; used on the sacrum for lumbago and constipation.

(*d*) *Clapping* with hand up and down the limbs and over the lungs back and front, to promote circulation.

(*e*) *Nipping*, i.e. pinching, small pieces of flesh and skin in order to stimulate; sometimes used in cases of hysteira.

5. *Vibrations* applied with the flat of the hand, and used as the lightest form of stimulus over an effused area, such as a fracture at an early stage, when other massage movements are not possible.

6. *Nerve Frictions.*—These have a soothing effect, and are useful in acute conditions.

The Application of Massage.

In medicine many conditions are treated by massage movements. It is employed in the treatment of neurasthenia, chorea, insomnia, heart disease, rheumatism and diabetes. Hemiplegia, infantile paralysis, lumbago, sciatica and neuralgia are also treated with good results. Abdominal massage is of value in cases of obstinate constipation and other conditions.

In surgery it is extensively used. In joint diseases, as synovitis and rheumatoid arthritis, or in injuries, such as contusions, sprains, dislocations and fractures, it is found of value. Flatfoot is another condition in which massage is very beneficial.

THE WEIR-MITCHELL TREATMENT OF NEURASTHENIA.

Neurasthenia is a name given to a disease characterized by nervous exhaustion. The treatment is sometimes called a Rest Cure, and consists of isolation and complete rest. Another form of treatment, introduced by a Dr. Weir-Mitchell of Philadelphia, has been found of value. It includes perfect rest, isolation, generous dietary, along with massage and, in some cases, electricity.

During the first two days of the Weir-Mitchell treatment, the patient is fed on milk; four ounces being given every two hours, or five ounces diluted with whey every four hours.

On the third day, this same treatment is given, but the patient has ordinary breakfast. On the fourth day breakfast and lunch are allowed, milk being given at other times. On the fifth day full diet is given.

The full diet consists of:—

7 a.m. Black coffee.

8.30 a.m. Breakfast: Tea or coffee, fish, eggs, porridge with milk or cream.

10 a.m. Beef juice.

12 p.m. Glass of milk.

1.30 p.m. Luncheon: Meat, vegetables, stewed fruit and cream.

3 p.m. Glass of milk.

4.30 p.m. Tea (made with milk) bread and butter.

6 p.m. Beef juice.

7.30 p.m. Dinner: Same as luncheon, soup or fish in addition.

9 p.m. Glass of milk.

A glass of milk is left by the bedside.

Massage, one and a half or two hours in the day.

11 a.m. Massage of lower limbs and abdomen.

6 p.m. Massage of upper limbs, abdomen and back.

If the patient suffers from insomnia, the evening massage is left till 9 o'clock.

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